

THE MEDICAL JOURNAL OF AUSTRALIA

VOL. I.—46TH YEAR

SYDNEY, SATURDAY, MAY 2, 1959

No. 18

Table of Contents

[The Whole of the Literary Matter in THE MEDICAL JOURNAL OF AUSTRALIA is Copyright.]

ORIGINAL ARTICLES—	Page	CORRESPONDENCE—	Page
Outbreaks of "Q" Fever in Queensland Associated with Sheep, by E. H. Derrick, J. H. Pope and D. J. W. Smith	585	Growing Up in a Changing World	611
A Review of Californian Investigations into the Relation of Human to Ovine "Q" Fever, by E. H. Derrick	591	Severe Tetanus Treated with Tubocurarine Chloride ("Tubarine") and Tank Respiration.	611
A Fatal Case of "Q" Fever Associated with Hepatic Necrosis, by J. I. Tonge and E. H. Derrick ..	594	Health Care in Australia	611
Asian Influenza in Brisbane, by P. E. Lee ..	597		
Insomnia, by Barry Mulvany	598		
		OBITUARY—	
REVIEWS—		Darcy Rivers Warren Cowan	612
An Introduction to Surgery	601	OUT OF THE PAST	614
The Clinical Examination of the Nervous System ..	601	POST-GRADUATE WORK—	
Progress in Cardiac Surgery	602	The Post-Graduate Committee in Medicine in the University of Sydney	614
Water and Electrolyte Metabolism in Relation to Age and Sex	602	Royal Prince Alfred Hospital: Ear, Nose and Throat Department	614
Nutrition and the Papuan Child	602		
Psychosomatic Ophthalmology	602	THE AUSTRALIAN COLLEGE OF GENERAL PRACTITIONERS—	
Theory of Psychoanalytic Technique	602	New South Wales Faculty	614
Freud and the 20th Century	602	THE WORLD MEDICAL ASSOCIATION	615
Comparative Aspects of Hemolytic Disease of the Newborn	603	DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA	615
Sensitivity Reactions to Drugs	603	NOTES AND NEWS	615
Psychopharmacology	603	MEDICAL PRACTICE—	
Coffee and Caffeine	603	National Health Act	615
BOOKS RECEIVED	604	NOTICE—	
LEADING ARTICLES—		British Medical Association: Victorian Branch ..	616
A Surgeon Looks at Sharks	605	The Children's Medical Research Foundation of N.S.W.	616
CURRENT COMMENT—		NOMINATIONS AND ELECTIONS	616
"Q" Fever—An Epidemiological Puzzle	606	MEDICAL APPOINTMENTS	616
Palliation	606	DIARY FOR THE MONTH	616
Alterations in Enzymes of Body Fluids	607	MEDICAL APPOINTMENTS: IMPORTANT NOTICE ..	616
ABSTRACTS FROM MEDICAL LITERATURE—		EDITORIAL NOTICES	616
Radiology	608		
Radiotherapy	609		
ON THE PERIPHERY—			
Brussels, 1958	610		

OUTBREAKS OF "Q" FEVER IN QUEENSLAND ASSOCIATED WITH SHEEP.

By E. H. DERRICK and J. H. POPE,

Queensland Institute of Medical Research, Brisbane,

AND

D. J. W. SMITH,

Laboratory of Microbiology and Pathology, Brisbane.

An association of "Q" fever with sheep was first recognized by Caminopetros (1948) in Greece. Valuable studies of this association have been carried out in Northern California, where sheep are the main source of human infection; these have been reviewed by Derrick (1959). In South Australia, 10 cases of "Q" fever derived from sheep have been reported; four patients were abattoir workers handling mutton offal, two were sheep farmers, three were stockmen and one was a stockman's son (*Annual Reports of the Institute of Medical and Veterinary Science*, 1953-54, 1954-55).

In Queensland, previous reports of "Q" fever have emphasized an association of cases with cattle (Derrick, 1944). The occupational groups most affected were abattoir workers and dairy farmers. Nearly all cases came from coastal districts. Early in 1958, the epidemiological picture widened. Outbreaks occurred

on a sheep station in western Queensland during shearing, and at a fellmongery in Brisbane.

Most of Queensland's 23 million sheep are in the western part, much of which is well suited for merinos.

"Q" Fever on Station T.

This station of 87,000 acres lies in the Tambo district (Figure 1), about 460 miles west-north-west of Brisbane. The area is partly wooded, partly open downs. Shearing commenced on January 6, 1958, and finished on February 4. Thirteen flocks, totalling 24,708 sheep, were shorn. The shearing was begun by a team of 34 men, who had assembled from many different localities. They comprised one wool classer (who was also overseer), one "expert" (in machinery), 14 shearers, 14 shed hands (who assisted in various way in the shearing shed), two wool pressers and two cooks. Some arrived on January 4, the majority on January 5. They were quartered in four huts situated about 120 yards from the homestead and 200 yards from the shearing shed. Bathrooms, kitchen and mess hut were near the sleeping quarters. Catering was arranged by the shearing contractor.

The weather was hot and mostly dry. The last rain before shearing was on December 31 (135 points). During shearing, there were light showers on four days, which gave 15, 18, 14 and 7 points in the 24 hours up to 9 a.m. on January 18, 28, 29 and 30 respectively. One observer said it was the driest shearing on this station for at least ten years.

Cases of fever began to occur on January 17. Thirteen members of the team were admitted to three hospitals, where "Q" fever was suspected, and blood was obtained for specific tests. Others returned to their homes for treatment. Some with milder illnesses or more responsible duties continued to work. Altogether, 22 of the shearing team reported sick. Serological tests confirmed the illness as "Q" fever in 13 cases—in five by a rise in CF (complement-fixing) antibodies, and in eight by titres of from 1:32 to 1:512 in a single convalescent serum. With two other patients, a clinical diagnosis of "Q" fever was acceptable; they were sent to hospital with similar symptoms, but no convalescent serum was obtained. Another was shown to have rheumatic fever. The other six patients were not admitted to hospital, and no diagnosis could be made in the absence of clinical details and of serum. Gastroenteritis is a possible explanation, as some (not included in the 22) complained of this.

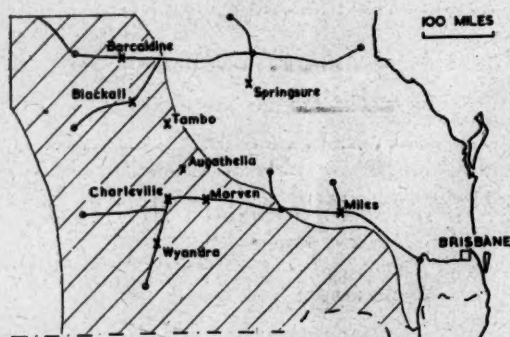


FIGURE I.

Map of portion of Queensland. X indicates districts where cases of "Q" fever have occurred. Sheep raising is important in the shaded area.

Thirteen men came to replace those unable to work. None of these acquired "Q" fever. One had a febrile illness, but the CF test for "Q" fever gave a negative finding on the thirty-second day.

Twelve males were permanently employed on the station. One, a stockman aged 48 years, developed "Q" fever on February 16; the diagnosis was confirmed by a CF titre of 1:128 on the fifteenth day.

The ages of the 15 in the shearing team whose illness was accepted as "Q" fever ranged from 15 to 56 years. Their experience in the industry also ranged widely. Some had been shearing for many years; the shed hand of 15 was working his first shed. There was no significant difference as regards age or experience between those affected and those unaffected (Table I). This was true whether or not the doubtful cases were excluded from the analysis or included in either group. Nearly all the doubtful cases were in older men.

The dates of onset of the cases ranged from January 17 to February 19 (Figure II). The median date was January 23. As the minimum reported incubation period of "Q" fever is 11 days, the median about 16 or 17 days and the maximum over 30 days, it is clear that most infections took place near the beginning of shearing operations. The distribution of the first 12 cases (for which the median date was January 22) approximates to that expected after a single or brief common exposure. The next two cases probably, and the last two cases certainly, indicate that the environment was also infective later.

Occupations also are shown in Figure II. Although the proportion of shearers and shed hands affected was almost the same, the mean date of onset was significantly earlier for shearers, if the last shearer, who obviously belonged to a different episode, is excluded. This implies

that shearers were more intimately exposed to infection than shed hands; a shorter incubation period suggests a higher dose of rickettsiae. Wool pressers appear to rank with shearers as regards intensity of infection.

After a sheep is shorn by the shearers, the fleece is collected by a picker-up and spread out on a table. Here a wool roller trims off the edges, which are of inferior quality, rolls the fleece and carries it to the classer's table. The classer grades it, and he or his assistant deposits it in the appropriate bin. From the edges, piece-pickers select pieces of various grades and direct them into bins. When sufficient wool has accumulated in a bin, pressers transfer it to the press and bale it.

This description, which summarizes a complex process, shows that the wool from each sheep is directly handled by at least six men in rapid succession. If the wool of a particular sheep carried *Coxiella burnetii*, all six would in turn be exposed to infection. Thus the whole outbreak could be explained by the hypothetical presence

TABLE I.

"Q" Fever Incidence in Shearing Team in Relation to Age and Experience

Age and Experience.	Number Affected.	Number Not Affected.	Total.	P.
Age:				
30 years or over ..	6	6	12	>0.5
Under 30 years ..	9	7	16	
Experience in sheep industry:				
Over three years ..	8	8	16	>0.5
Three years or less ..	7	5	12	
Total ..	15	18	28	

in the flock of a few highly infective sheep and the circulation of their wool through the shed. During shearing, the air of the shed is filled with fine wool fibres and dust, and this would facilitate infection by inhalation.

When the position each man occupied at his work was plotted on a plan of the shed, there was no concentration anywhere of those affected with "Q" fever. This accords with the mass movement of wool within the shed and the general distribution of airborne particles.

The possibility of percutaneous infection existed with shearers (less so with others in the team) in that the hand and forearm became scratched by burrs in the wool.

Investigations on Station T.

A visit was made to the station and district early in March. Veteran shearers and old residents could not recall any such outbreak in western Queensland during shearing in previous years. However, as noted later, inquiries disclosed some previous sporadic cases.

An endeavour was made to contact members of the shearing team, and to obtain information from them and a first or second sample of serum. This was only partly successful, as in the meantime they had scattered widely. The results of serum tests on patients have already been mentioned. Serum from four who had remained well and from the rheumatic fever sufferer gave negative results to the CF test. These five were all young, and were comparative newcomers to shearing.

Serum was obtained from the eight available permanent male employees on the station. These had worked there from two months to four years. No CF antibodies were found, except in the serum of the stockman mentioned above, who had been there four years and was then recovering from his illness. This low incidence made it likely that the risk of infection was associated with shearing rather than with general station work. It may be significant that the affected stockman had occasionally gone into the shearing shed, and had assisted slightly during the shearing of rams (400) and stragglers (200), which was carried out on February 6 and 7, immediately after the main shearing (he had also mustered some

milking cows and branded their young calves sometime before his illness, and often drank a mugful of fresh milk). Another station hand was picker-up in the supplementary shearing. Other station hands helped to muster the sheep, but took no further part in the shearing.

Inspection of the sleeping and eating quarters did not supply any clues to the mode of infection. Cases were not associated with any particular sleeping location. The sick stockman did not sleep on the station. Rain water, stored in tanks, was used for drinking, and creek water for bathing.

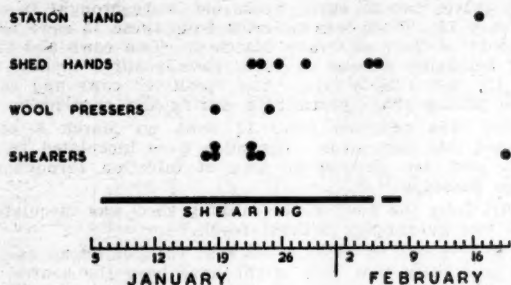


FIGURE II.

Onset of cases on Station T in relation to shearing.

The outbreak could not be explained by the ingestion of infected milk. Fresh unheated cows' milk from the station herd was used at the homestead and by station hands, but none was supplied to the shearing team. Some of the team used to drink unheated cows' milk when they visited the neighbouring town, but this applied to only five of the patients.

Attention was directed to the sheep and other animals on the station, and a serological survey of them was carried out. Ticks, also, called for investigation. Sheep keds do not occur in the area. Flies and mosquitoes had not been troublesome.

Sheep.

Most suspicion fell on these animals as the source of the human infections, because of the close and sustained contact of the shearing team with either them or their wool. There was no history of illness in the sheep, nor any untoward incidents at or since the previous shearing in January-February, 1957. Lambing took place from April to June, and produced 7000 lambs. Lambs were earmarked, castrated and docked when six to eight weeks old, and weaned at about four months; the sexes were separated in November. Ewes were crutched in August and September. Sheep born in 1956 had the Mules operation in August, 1957. Dipping to control lice, and drenching for intestinal worms had been carried out when required. The relation of the outbreak to the sheep calendar is shown in Figure III.

The serological testing of sheep was confined to the first six flocks that were shorn, since the dates of onset indicated that the beginning of shearing was the significant period. Table II shows the details of these flocks.

The complement-fixation test with a *C. burnetti* antigen was first applied. This test has been carried out for seven years at the Laboratory of Microbiology and Pathology by the technique of Lennette *et alii* (1949). It has proved very satisfactory with human sera for the routine diagnosis of febrile illnesses. However, the results with sheep sera were quite irregular. Many sera were anticomplementary; many gave positive results with both the *C. burnetti* antigen and a control typhus antigen. Moreover, repeated tests on the same sera gave inconsistent results.

Lennette *et alii* (1949) have mentioned the tendency of sheep sera to exhibit non-specific effects, and the importance of performing CF tests as soon as possible

after collection in order to avoid them. In this investigation, the blood samples were refrigerated within three hours of collection, and remained so except during transport by air. One to three days elapsed between their collection and arrival at the laboratory. After separation from the clot, sera were stored at 4° C. until examined one to eleven days after collection. The incidence of anticomplementary and non-specific reactions was directly related to the period of delay in transit and the length of storage. The effect of inactivation temperatures greater than 60° C. was not investigated, but attempts

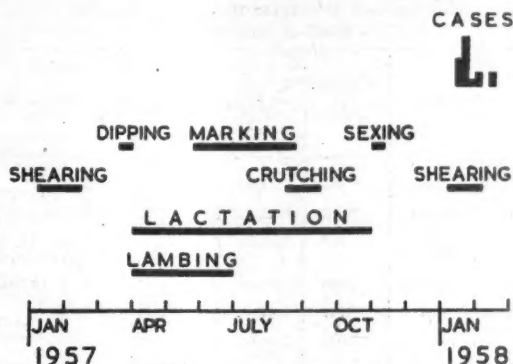


FIGURE III.

Cases in relation to the sheep calendar on Station T. This figure may be compared with Figure I of the accompanying Californian review.

to remove the undesirable properties from serum by treatment with complement, kaolin, acetone and ether were made on sera which had been held at -20° C. for periods of up to three months. These observations are more fully described in the *Annual Report of the Health and Medical Services of Queensland*, 1957-58, page 90. None of the techniques proved successful in our hands. Finally, the CF test for these sheep sera had to be abandoned and reliance placed on specific agglutination.

Table II shows that 11% of all the sheep tested gave evidence of infection with *C. burnetti*. Each of the first five flocks included some infected sheep, the highest incidence (26%) being found in the third flock (culled maiden ewes). The agglutination test is as specific as complement fixation, but Abinanti, Welsh *et alii*, (1953) have reported that, in experimentally infected sheep, agglutinins do not persist as long as complement-fixing antibodies. This suggests that the estimate of the incidence of infection might have been higher than 11%, if assessment by complement fixation had been possible.

The presence of numerous infected sheep on Station T supports the circumstantial evidence pointing to sheep as the source of the human infections.

Wool and Dust.

Five samples of wool and dust from the shearing shed were obtained on March 6. Samples from 15 bales of the wool shorn from the first six flocks were obtained on March 18 and 25. After arrival in the laboratory, these were held at -20° C. until tested, and prepared for inoculation into guinea-pigs by a technique based on that of Abinanti *et alii* (1955). Even with penicillin, some inocula remained highly contaminated, and the usual dose of 1 ml. given intraperitoneally killed the guinea-pigs. Mortality was avoided by the use of three graduated doses (0.1 ml. subcutaneously, 0.1 ml. intraperitoneally and 1 ml. intraperitoneally) at weekly intervals. Two guinea-pigs were inoculated from each specimen; the CF test on serum taken four to five weeks after inoculation was used as the criterion of infection. No evidence was obtained of the presence of *C. burnetti* in wool or dust.

Ticks.

A circumstance of considerable interest was the presence on the sheep during shearing of very numerous *Amblyomma triguttatum* Koch. This tick has for years been seen on sheep in western Queensland, but never in such numbers as in January, 1958. Ticks were found in the wool, which is unusual, as well as on bare areas. Shearers cut into them while shearing, and many were noticed crawling over the floor of the shed. There were more ticks on flocks that had been grazing in

TABLE II.
Results of Sheep Survey.

Description of Flock.	Number in Flock.	Date Shearing Began (1958).	Proportion with Serum Agglutinins against <i>C. burnetti</i> .	Reciprocal Titres.
Ration sheep, nearly all wethers.	495	January 6	3/18 (17%)	8, 8, 64
1956 drop wethers	3712	January 6	2/33 (6%)	32, 64
1956 drop culled maiden ewes. ¹	927	January 9	9/35 (26%)	8, 16, 16, 16, 32, 32, 64, 64, 64
1951 drop aged ewes. ^{2,3}	1148	January 9	4/34 (12%)	8, 8, 16, 64
1952 drop ewes ² ..	2747	January 10	2/34 (6%)	8, 8
1953 drop ewes ² ..	1954	January 14	0/20 (0%)	
Total of six flocks	10,983		20/174 (11%)	
Seven flocks ⁴ ..	13,725	January 15	Not tested	

¹ This flock had the heaviest tick infestation.

² This flock occupied the same paddock as that in which the milking cows calved.

³ Last lambed April to June, 1957.

wooded paddocks than on those on open downs, and it may be worthy of note that the most heavily infested flock had the highest incidence of antibodies.

Kangaroos and wallabies are the main hosts of *A. triguttatum*. It appears to have a seasonal cycle. Nymphs become numerous in August and September, and females reach their peak about January. *A. triguttatum* will attack man, but no one gave a history of tick bite during shearing.

Two small batches of *A. triguttatum* had already been collected from sheep on Stations T and SH on February 13 and 14 and sent to Brisbane. By March, their numbers had greatly diminished, and only two (one alive, one dead) were found on 177 sheep. Ten dead specimens were obtained on March 18 from baled Station T wool in Brisbane. Altogether, 28 were inoculated into mice and guinea-pigs, but *C. burnetti* was not isolated.

The tick, *Rhipicephalus sanguineus* (Latrielle), was very common on dogs on Stations T and SH. Five batches, comprising 70 specimens, were collected between March 2 and 7; they were inoculated into mice and guinea-pigs without result.

Thus, no evidence of infection in ticks has been found, but the numbers examined are too small to justify conclusions.

Kangaroos.

Two species are common in western Queensland—*Macropus major* Shaw, which inhabits wooded country, and *Megaleia rufa* Desmarest, which prefers open downs. Their number increased considerably from 1955 to 1957, but fell off somewhat in 1958.

Serum was obtained in March, 1958, from five kangaroos of unidentified species on Station T. One contained CF antibodies to a titre of 1:32, two gave negative findings and two were anticomplementary. The "negative" and anticomplementary sera gave negative results to the agglutination test. The evidence that one local kangaroo had been infected with *C. burnetti* is

suggestive, but the testing of a much larger series is called for.¹

Cattle.

The station carried 200 beef cattle, and 60 milking cows with their calves. The beef cattle were remote from the homestead, and were not investigated. Most of the milkers were kept five to eight miles out, and their calving took place in the paddock in which the fourth flock—aged ewes—was held. Calving had occurred throughout the year. Some cows were brought in with their calves for milking as required. Eight were at the homestead throughout the shearing period; five more, with calves two or three weeks old, were brought in on January 14. Blood was collected from these 13 cows and from 11 of their calves on March 2. Two cows and the calf belonging to one of them gave positive results to the CF test (Table III). The "positive" cows and calf were among those brought in during the shearing.

Milk was collected from 12 cows on March 3 and divided into two pools. Six mice were inoculated from each pool, but showed no sign of infection throughout three passages.

Dirt from the floor of the milking shed was inoculated into two guinea-pigs without result.

The presence of infected cows at the homestead raises the possibility that they might have been the source of the infections among the shearing team. Points favouring this suggestion are that at times the cows grazed right beside the shearers' quarters and shearing shed, the shearing team slept within 100 yards of the milking yard, and they passed within 50 yards of it four times a day in walking between the quarters and the shed. However, the balance of evidence is against it. The cows were not at the homestead when potentially most infective (at calving), the cows and the calf which gave serologically positive findings did not arrive at the homestead until after at least ten patients had been infected (assuming a minimum incubation period of 11 days), contact of the shearers with sheep was much closer than with cattle, and the number of infected sheep contacted was considerably greater. Further, the station hands had at least as much contact as the shearers with the 13 milkers at the homestead; one hand, who showed no clinical or serological evidence of infection, had milked the cows daily for four months. The contact of the affected station hand with cattle has already been noted.

Other Animals.

No serological evidence of infection was found in other animals (Table III). The nine horses tested were among those in daily use at the time of the visit. They were drawn from a pool of 40 working horses used in turn. There were altogether 100 horses on the station. The dogs had close contact with the sheep. The domestic pig tested was one of four; wild pigs on the station were not sampled. There were no goats on the station; blood was collected from 20 belonging to the adjacent town.

Other Cases of "Q" Fever in Western Queensland.

As a result of inquiries stimulated by the outbreak on Station T, records have been obtained of 20 other cases of "Q" fever in western Queensland. The diagnosis was confirmed in all by either a rise of CF antibodies in paired sera or by a significant titre in a single convalescent serum. These cases, as well as the 16 from Station T, are summarized in Table IV. Other probable cases of "Q" fever were reported, but are excluded because serum could not be obtained for testing.

Cases have occurred in at least 12 localities in nine districts (Figure 1). They date from as far back as January, 1955.

All 36 patients were males. They comprised one shearing contractor, fifteen shearers, eight shed hands, three wool pressers, two managers and three hands on sheep stations. Only four—a dairy farmer, a dairy

¹ Other kangaroos in western Queensland have since been found to possess serum antibodies against *C. burnetti*.

hand, a clerk and a mechanic—were not associated occupationally with sheep. Some of the sheep men had had contact also with cattle.

Between January and March, 1958, cases of "Q" fever occurred among shearing teams on four other stations beside Station T. On Station SH, shearing was carried out from January 6 to 25 by a team of 11. A shearer became ill on January 20, a shedhand about January 30 and a wool presser about February 8. On Station FH, shearing was carried out from January 13 to 30 by a team of 12. Three shearers became ill on January 23,

ages ranged from 27 to 50 years. The dates of onset were March 9, 14, 15, 16, 17, 20 and 22, April 6 and 10, May 26. In eight cases, the diagnosis was confirmed by a rise in the titre of complement-fixing antibodies. In the other two, only a convalescent serum was available; the titres were 1:16 and 1:32.

This fellmongery and the associated tannery handle both "green" sheepskins straight from the abattoir and dried sheepskins, preserved with sodium arsenate, derived from many country centres. There are many steps in the processing. Briefly, the skins are washed (dried ones

TABLE III.
Results of Tests on Various Animal Sera.
(Sera collected March 2 to 9, 1958.)

Animal.	District and Station.	Number Tested.	Number with CF Antibodies against <i>C. burnetti</i> .	Comments.
Cows.	Tambo, T.	13	2 (32, 32) ¹	
Calves.	Tambo, T.	11	1 (64)	
Cows.	Tambo, SH.	2	0	
Calves.	Tambo, SH.	2	0	
Cows.	Charleville, D.	5	2 (16, 32)	
Horses.	Tambo, T.	9	0	
Horses.	Tambo, SH.	1	0	
Dogs.	Tambo, T.	9	0	Two gave non-specific results.
Goats.	Tambo, T.	20	0	
Pigs.	Tambo, T.	1	0	
Kangaroos.	Tambo, T.	5	1 (32)	Two were anti-complementary; four gave negative results to agglutination tests.

¹ Reciprocal titres in parentheses.

February 5 and February 10 respectively. On each of these two stations, the scattered distribution of cases points to more than one infective occasion. A shearer worked at Station ND from January 27 to February 9, and became ill on February 14; another at Station R from late in January to February 21, and became ill on March 4. Ticks were very numerous during shearing on SH and FH; no information was obtained about their incidence on either ND or R.

On Station SH, it was reported that at least two cases of fever had followed shearing in January, 1955, and one in December, 1955. In all three, the serum in March, 1958, had a CF titre of 1:16. The first two patients had been admitted to hospital, the third had been treated at home. Their clinical notes in conjunction with the presence of antibodies left little doubt that their illnesses were "Q" fever. Another shearer was admitted to hospital with fever in April, 1957, after shearing at Station MD; his serum titre in March, 1958, was 1:32.

Further evidence that "Q" fever was present in western Queensland before the 1958 outbreak is given by two cases that were recognized in July, 1956. One was in a man who helped in a dairy at Charleville, the other was in a clerk at Springsure. *C. burnetti* was isolated in mice inoculated with the blood of the clerk.

The manager of Station D became ill on December 28, 1957. His sheep had lambed in June and July, 1957, were shorn in August and were dipped in November. Lambs were shorn in November. These operations had been uneventful. During December he was occupied mostly in fencing, and had little to do with the sheep. He had 43 cattle, including 10 milkers, and himself milked two cows daily. Two of five cows tested had CF antibody titres of 1:16 and 1:32. These two were not those he was milking in December, but they do indicate the endemicity of *C. burnetti* on his station.

Outbreak of "Q" Fever at a Fellmongery.

From March to May, 1958, 10 cases of "Q" fever occurred at a fellmongery in Brisbane. All the patients were males (there were no females employed). Their

TABLE IV.
Thirty-six Cases of "Q" Fever in Western Queensland.

District.	Date.	Number of Cases.	Age (Years.)	Occupation.
Charleville.	July, 1956.	1	37	Helper on dairy.
Charleville.	February, 1958.	1	32	Motor mechanic.
Charleville, D.	December, 1957.	1	32	Manager of sheep station.
Wyandra, R.	March, 1958.	1	29	Shearer.
Augathella, ND.	February, 1958.	1	19	Shearer.
Morven.	February, 1958.	2	23, 25	Manager and station hand on a sheep station.
Miles.	December, 1957.	1	33	Dairy farmer.
Tambo, T.	January - February, 1958.	15	15 to 56	Shearing team.
Tambo, T.	February, 1958.	1	48	Station hand.
Tambo, SH.	January - February, 1955.	2	15, 37	Shearing team.
Tambo, SH.	December, 1955.	1	32	Shearer.
Tambo, SH.	January - February, 1958.	3	26, 44, 56	Shearing team.
Tambo, MD.	April, 1957.	1	33	Shearer.
Blackall, FH.	January - February, 1958.	3	19, 23, 24	Shearers.
Barcaldine.	January, 1958.	1	35	Station hand on sheep station.
Springsure.	July, 1956.	1	16	Clerk.

require soaking for 48 hours), deburred and hung in "sweat chambers" to allow enough decomposition to loosen the wool. The wool is then pulled off, washed and dried in a fugal (centrifuge) and boxed for transport away to a scour. Pelts, free from wool, pass to the tannery section. All these operations are conducted progressively under one roof. The office staff are accommodated in a separate building 20 yards from the fellmongery.

TABLE V.
Sectional Distribution of Cases at Fellmongery-Tannery.

Section.	Number Employed.	Number Affected.
Office, store, transport	6	0
Fellmongery	26	7
Tannery	12	0
Both fellmongery and tannery ..	3	3
Total	47	10

Table V shows the sections in which the patients worked, and the total number employed. Seven patients had worked exclusively in the fellmongery, the other three—two maintenance men and a carpenter—in both the fellmongery and the tannery. The absence of cases in the tannery suggests that the risk was less there than in the fellmongery. However, the difference is not statistically significant ($\chi^2=2.4$; $0.2 > P > 0.1$).

There seems no alternative to the hypothesis that *C. burnetti* was brought to the fellmongery on sheepskins. There was no other relevant common factor among the men affected. Infective sheepskins appear to have arrived on at least four occasions. No attempt was made to trace their source, because of the large number handled daily and the variety of agencies through which they came.

On-the-spot observation went far to explain why the cases were confined to the fellmongery section. The earlier processes are wet and accompanied by much splashing. During them, any rickettsiae carried on the skins could readily be thrown into the air with droplets. No substance that would inactivate *C. burnetti* is added to the wash water. There is also close contact of personnel with the skins or the wool. Wool fibres are thrown up from the fugal. By the time the thoroughly washed and wool-less pelts reach the tannery, it is unlikely that removable rickettsiae would still remain on them.

There must have been some unusual set of circumstances to have brought about this outbreak at the fellmongery. The manager, who has been 38 years in the business, and the foreman, who has been 29 years, do not recall a similar occurrence. The infection of long-standing employees shows that they had not become immunized; the patients had been employed 29, 23, 20, 17, 16, 12, 10, 8, 1.5, and 1.1 years. The incidence was not significantly decreased with either age or length of employment (Table VI). Previous exposure to *C. burnetti* at the fellmongery must have been quite uncommon, if indeed it had occurred at all.

TABLE VI.

"Q" Fever Incidence at Fellmongery in Relation to Age and Duration of Employment.

Age and Duration of Employment.	Number Affected.	Number Not Affected.	Total.	P.
Age:				
45 years or over ..	3	17	20	>0.5
Under 45 years ..	7	20	27	
Duration of employment:				
16 years or over ..	5	13	18	>0.5
Under 16 years ..	5	24	29	
Total ..	10	37	47	

Discussion.

The association of cases of "Q" fever with shearing on at least six stations, the infection of fellmongers handling sheepskins and the presence of antibodies in 11% of sheep on Station T make it clear that in Queensland, as in certain other countries, human infection can be derived from sheep. The circumstances in the shearing shed and fellmongery suggest that *C. burnetti* was abundant on the wool of some of the sheep or on the sheepskins, and that it was inhaled by workers in the shearing shed along with wool fibres thrown up during the handling of wool at and after shearing, and by those in the fellmongery with wool fibres or infected droplets of the water in which the wool was washed.

That wool may carry *C. burnetti* is well established. However, the mechanism by which wool on Station T could have become infective at the time of shearing is not clear. In Californian experience (Derrick, 1959), sheep infected with *C. burnetti* did not shed rickettsiae apart from parturition. Infectivity was primarily associated with placenta, birth discharges, faeces and milk, particularly the first. Contamination of the wool, especially of the crutch, could readily follow. The resistance of *C. burnetti* allowed it to persist in the environment, in dust, on wool (unshorn or shorn) or on clothing, and thus to give rise to delayed or remote infection. These phenomena account satisfactorily for most human cases in Northern California, but do not clearly explain the cases on Station T. Parturition hardly applies to the first three flocks shorn (nearly all wethers and maiden ewes), yet it was on the days these were shorn that at least four of the human infections appear to have arisen. With the other ewes, at least six months had elapsed since lambing.

The following are some conceivable explanations.

1. That rickettsiae had remained on the wool of some sheep since lambing. This seems a long time for them

to have persisted on sheep held in open paddocks in a warm, sunny climate, especially as the wool most liable to contamination had been removed in an uneventful crutching about four months before shearing. A few stragglers had escaped crutching, and more suspicion might rest on these (the ration wethers also had not been crutched).

2. That there may have been some parturitions shortly before shearing among the few ewes running with the ration wethers. It is likely that among the wethers there was an occasional animal in which one testis had escaped removal. Such parturitions, if any, would have been very few. No young lambs could be remembered in this flock at shearing time. There were definitely no lambs born later than June among the other flocks.

3. That the wool of some of the aged ewes had become contaminated with rickettsiae from birth discharges or from the faeces of cattle which had recently calved in the same paddock. But some of the men must have been infected before, and some after, this flock was shorn.

4. That the wool of some sheep had become contaminated with excreta from infected kangaroos. The first four flocks shorn had been kept in wooded paddocks, where kangaroos were numerous. However, nothing is known of the excretion of rickettsiae by infected kangaroos.

5. That the wool of a latently infected sheep might have become infective by some mechanism unrelated to parturition. There is no experimental evidence to support this.

6. That ticks made the wool infective.

Information at present is not sufficient for the acceptance of any of these proffered explanations. However, as noted above, the mechanism of only a few highly infective sheep would be required to give rise to the outbreak.

A further possibility is that rickettsiae were already in the shed when shearing began on January 6, and were thrown up into the air by the shearing operations. This seems unlikely. No lambing had taken place in or near the shed. From time to time sheep had been yarded beside the shed for dipping, drenching, etc. The crutching in August-September could conceivably have been a source of rickettsiae. Yet it seems out of proportion that no infections occurred at the time these hypothetical rickettsiae were dispersed, but that those then deposited in the shed should cause multiple infections four months later. Furthermore, the infections which arose later in the shearing period on Station T, as well as on Stations SH and FH, point to a continuing source of infection.

No stock had recently been imported into Station T from other districts. Sheep were bred on the station, except that rams were bought from an associated station 14 miles away. No cattle had been brought in for at least two years, but dairy cows from the nearby town often strayed onto the property.

It is not difficult to postulate the arrival of infective sheepskins at the fellmongery. Among the thousands dealt with each week, some could have come from recently parturient ewes, for some lambing occurs in every month. A less likely source might have been the skin of a slaughtered ewe contaminated from milk when it was dissected from the udder.

C. burnetti is now widely distributed in western Queensland. It has become enzootic there in sheep, cattle and, probably, kangaroos. Many opportunities would occur for cross-infection between cattle and sheep. It is the custom for sheep stations to carry some cattle also; the two species are not kept apart. How and when *C. burnetti* invaded the area would now be difficult to determine. Inquiries disclosed human infection dating back three years; the wide distribution suggests a much longer endemicity. Sporadic cases of "Q" fever could easily have passed unrecognized. However, the inability of veteran shearers and fellmongers to recall previous

outbreaks, and the similar incidence in older and younger workers, suggests that transmission to man has not readily occurred, and that there must have been some special circumstances to precipitate the 1958 cases.

Several circumstances, which may or may not be relevant, should be mentioned. First, the year 1957 was unusually dry in most of the sheep area. For example, at Tambo the total rainfall for 1957 was 14.31 inches—the lowest for six years (the average of 47 years there is 20.18 inches). The dryness of the first part of the shearing period on Station T in January, 1958, has already been mentioned. Secondly, the outbreak occurred during the season when *A. tritatum* was at a maximum and in a year of exceptional prevalence. Its main host, the kangaroo, had also become unusually numerous. Much more investigation of ticks must be carried out before any suggestion that they might have played a part in the outbreak can be considered. As shown in California, ticks are not necessary for the maintenance of *C. burneti* in a flock of sheep.

In the year July, 1957, to June, 1958, a striking increase in the incidence of "Q" fever was noted in Queensland generally. All serological investigations for "Q" fever in Queensland are made at the Laboratory of Microbiology and Pathology, and the number of cases in this State diagnosed in the last four years have been as follows (Tonge, personal communication): 1954-55, 65; 1955-56, 62; 1956-57, 74; 1957-58, 187. The cases in western Queensland may, therefore, represent a local manifestation of widely acting causative factors.

Summary.

"Q" fever is widely endemic in western Queensland. Thirty-six human cases are reported from twelve localities. These date from 1955, and include an outbreak of 16 cases on one sheep station in January-February, 1958. There is serological evidence of infection in sheep, cattle and kangaroos.

Sheep in Queensland can be a source of human infection. Most of the western Queensland cases were among shearing teams. Ten cases occurred from March to May, 1958, among workers at a Brisbane fellmongery handling only sheepskins. The likely explanation of these infections is that rickettsiae were present on the wool of some sheep.

These new observations extend the known geographical and occupational range of "Q" fever in Queensland.

Acknowledgements.

We are greatly indebted to many medical practitioners and to individuals connected with the sheep and wool industries for their help. Some of these went to considerable trouble and expense to further the investigations.

References.

- DERRICK, E. H. (1944). "The Epidemiology of 'Q' Fever". *J. Hyg. (Lond.)*, 43:357.
DERRICK, E. H. (1959). "A Review of Californian Investigations into the Relation of Human to Ovine 'Q' Fever". *Med. J. Aust.*, 1:591.

For other references, see Derrick (1959).

A REVIEW OF CALIFORNIAN INVESTIGATIONS INTO THE RELATION OF HUMAN TO OVINE "Q" FEVER.

By E. H. DERRICK,

Queensland Institute of Medical Research, Brisbane.

"Q" fever is endemic in California. In the southern part of the State, as in coastal Queensland, human "Q" fever has mainly been associated with cattle. In Northern California, however, the majority of cases have occurred in sheep-raising areas, and many patients were adult males in close contact with sheep. This led to a valuable series of investigations into the disease in sheep and its relation to human infection. The recent recognition that human infection in Australia also may be derived from sheep

(Derrick *et alii*, 1959) makes the Californian investigations of vital importance here, and has inspired the preparation of this review.

Experimental Infection of Sheep.

The results of experimental infection of either non-pregnant or pregnant non-parturient ewes by intravenous or intratracheal inoculation of *Coxiella burneti* (Lennette, Holmes and Abinanti, 1952; Abinanti, Welsh *et alii*, 1953) may be summarized as follows.

1. There was no febrile reaction or other sign of illness, except when huge doses of rickettsiae had been given intravenously. Some such sheep developed fever lasting seven to seventeen days, after an incubation period of six to 48 hours.

2. In many cases, rickettsiae could be recovered from the blood. This rickettsæmia occasionally lasted as long as eight or nine days, but was usually much shorter.

3. Antibodies commonly appeared in the serum. After huge infecting doses, complement-fixing antibodies might be detected in four or five days; after smaller doses, not for three or four weeks. The titre rose gradually or rapidly to a maximum of 1:8 to 1:256. The duration of detectable antibodies also varied. In a sheep with a maximum titre of 1:8, they had disappeared by 60 days after inoculation. In another whose titre reached its maximum of 1:64 at 98 days, this was still 1:16 when observation ceased at 250 days. Agglutinating antibodies both appeared and disappeared earlier than complement-fixing antibodies.

4. The excretion of *C. burneti* in faeces, urine, oral or nasal secretions, or expressed secretion from the non-lactating mamma, was extremely rare. An apparent exception was the appearance of rickettsiae in faeces for up to three days after intratracheal inoculation; these were probably inoculated organisms which had been swallowed.

5. *C. burneti* might persist in certain tissues for at least six weeks. When seven sheep were examined at this interval after intravenous inoculation, rickettsiae were recovered from pooled spleen-liver-kidney in five, from lung, mammary gland and lymph nodes in one, but not in any from the brain, heart or aorta.

Sheep, therefore, could be infected with *C. burneti* by intravenous or intratracheal routes. The latter simulates the route of natural infection. The infection was symptomless and, in living non-parturient sheep, recognizable only by serological tests. Although rickettsiae might persist in certain internal organs for an undefined period, the risk of external spread appeared to be negligible.

The Effects of Parturition.

A dramatic change in the infectivity of a sheep with a latent infection may be brought about by parturition. Within minutes there can be an intense and widespread contamination of the environment. Rickettsiae may be excreted in placenta, birth fluids and faeces, and become dispersed through the air. The effects of the primary contamination steadily diminish and mostly disappear within about two weeks. However, infectivity may continue beyond this period. *C. burneti*, being highly resistant, may remain viable in the environment, as on wool, soil or attendants' clothing for long periods. Further, rickettsiae may multiply in the mammary glands, and be excreted in the milk throughout lactation. These points will be considered in turn.

1. Placentas were examined from 72 sheep on eight widely separated ranches, where "Q" fever was known to be enzootic in the sheep and where human cases had occurred. Of these, 21 were found infected (Welsh *et alii*, 1951). The infectivity of the placentas might be enormous; six that were titrated contained from 10^1 to 10^6 hamster-infective doses per gramme. The placenta is undoubtedly the most important source of contamination of the environment at parturition.

2. Birth fluids were collected from the same group of sheep. Samples were taken as soon as the bag of waters was sufficiently extruded, and were referred to as "birth

fluids", since "unequivocal distinction between amniotic and allantoic fluid could not be made under the conditions of field collection". Of 34 samples, four contained *C. burnetti* in titres up to at least 10^4 hamster doses (Abinanti, Lennette *et alii*, 1953). Birth fluids were not infected unless the placenta was also infected; the converse did not necessarily hold. The titre tended to be lower in birth fluids than in placentas. The fluid, being essentially acellular, would not allow multiplication of rickettsiae, but abrupt rupture of membranes and expulsion of up to a litre of fluid would disseminate rickettsiae into the air very effectively.

3. The recovery of *C. burnetti* from the faeces of two parturient sheep was reported by Winn *et alii* (1953). There were $10^{2.5}$ and $10^{3.5}$ hamster doses per gramme, which is rather less than with the corresponding placentas (10^6 and 10^5). The faeces had given negative findings *ante partum*. *Post partum*, the titres rapidly fell; infectivity was still present at seven days, but not at fourteen.

It is likely that many, if not all, of the faecal rickettsiae had been inhaled or ingested with food contaminated with floor litter. However, excretion from some focus in the body or multiplication in the intestinal tract cannot be excluded off-hand.

A further observation was that rickettsiae might appear temporarily in the faeces of non-parturient sheep in more or less close contact with an infected parturient sheep (Abinanti, Welsh *et alii*, 1953; Lennette and Welsh, 1958). This introduces the important concept of "passive contamination". An animal can ingest or inhale rickettsiae at an infected locus, and then during the next few days distribute them widely over the pasture in faeces.

4. The urine of one sheep was infective on the fifth and eleventh days *post partum*. This was a rare observation, and urine seems unimportant in transmission. (In Switzerland, urine may be of greater importance—Wiesmann *et alii*, 1956.)

5. Daily tests of the air were made in six indoor pens, each holding a pregnant sheep which had been experimentally inoculated (Welsh *et alii*, 1958). *C. burnetti* was not detected before parturition. It appeared in the air within minutes of parturition, and remained there for an average of 12 days afterwards. In these sheep, faeces remained infective for an average of 14 days. As the pens were cleaned out 14 days after parturition, there was, in this closed environment, a close correlation in time between the contamination of floor litter, faeces and air.

In another study (Lennette and Welsh, 1958), the lambing of two naturally infected sheep took place in open pens. Contamination of the air was most intense in the lambing pen, but within 12 hours rickettsiae were recovered from the air in neighbouring pens up to 30 feet away. The infectivity of the air in the lambing pens continued for five and seven days *post partum*, ceasing soon after the sheep were removed and the pens cleaned out.

DeLay *et alii* (1950) recovered *C. burnetti* from the air of a barn which had been used by sheep up to approximately 30 days before the sampling. During this interval, none of the animals had had access to that part of the barn from which samples were taken, although they camped in the adjacent yard. The dirt floor of the barn was covered with several inches of loose, dry, very fine soil and manure. This finding emphasizes the ability of *C. burnetti* to persist in an environment. Not only had 30 days elapsed since sheep were present, but also the sampling date (August 18) was at least four months after the lambing season, and at least some weeks after lactation had probably ceased.

The air inside and outside buildings that harboured sheep on seven ranches was tested at least weekly for a year (Lennette and Welsh, 1958). Air was drawn through a cotton plug sampler at the rate of ten litres a minute for usually two hours, and an extract of the cotton plug inoculated into hamsters. In 1200 tests, *C. burnetti* was recovered 39 times. Recoveries were most frequent in November, the first lambing month, but were made

occasionally in all other months except February and September. Some recoveries were made at least six months after the lambing season inside buildings, and at least five months after it outside. Air contamination was favoured by dry conditions and calm weather.

Infected aerosols are classified by Welsh *et alii* (1958) as primary, for instance those arising at parturition, or secondary, as when rickettsiae deposited on wool or soil or clothing are later forced into the air. Since *C. burnetti* usually enters man by the respiratory route, and this route has been shown to be effective also in sheep, these aerosols form an important stage in the transmission of infection from sheep to man or from sheep to sheep.

6. Wool on sheep has been found infective as long as 65 and 73 days after parturition (Lennette and Welsh, 1958). It is noteworthy that infective wool was found not only in the crutch, where it would readily be contaminated by birth discharges or faeces, but also in the neck. The titres were high— 10^4 to 10^6 hamster doses per gramme. A suggested explanation is that the fleece may attract infective particles from the air electrostatically, and that the greasy nature of wool may assist in retaining them. If these rickettsiae had remained viable on the wool since the immediate post-partum period, it exemplifies considerable ability to resist the environment. The indoor housing (these two sheep were among the six mentioned above as held in indoor pens) undoubtedly contributed to the persistence of the rickettsiae.

7. Milk (or rather udder strippings, as the lambing season was well past) was expressed from five ewes in a flock that had a high percentage of serum antibodies (Lennette *et alii*, 1949). Two of the samples infected guinea-pigs. Another flock of ewes in Southern California was selected for investigation, because a man who watched their unloading from trucks developed "Q" fever about 14 days later (Jellison *et alii*, 1950). They had been separated from their lambs for more than two months. Lactal secretion was obtained from 104 and combined for inoculation into 13 pools. Two pools gave positive results.

It is not evident how often the mamma becomes involved among ewes that show active infection with *C. burnetti* at the time of parturition, or after what period of latency following an attack a mammary infection may appear. The milk of three ewes that lambed 53, 70 and 87 days after experimental infection gave essentially negative findings (only one positive finding in 50 examinations) (Abinanti, Welsh *et alii*, 1953). However, infection, when present, can persist throughout lactation, as noted above.

Milk seems unimportant for transmission. Its content of rickettsiae is probably quite low, judging by the prolonged incubation period in one inoculated guinea-pig (20 days), and by analogy with cow's milk, and it may also contain antibodies.

The Comparative Epidemiology of Human and Ovine Infection.

Clark, Lennette and Romer (1951) analysed 350 cases of "Q" fever occurring in Northern California. There were small epidemics as well as many sporadic cases. The "working age" group (20 to 59 years) provided 83% of cases. Males comprised 91%. There was a pronounced seasonal trend; over 60% of cases occurred in the three spring months—March, April and May—with a peak early in April (Figure 1). The patients had a wide diversity of occupations, but a common factor with 76% was contact with livestock, at their work, their residence or in the course of visits. Sheep were the main animals contacted, but in some localities the contact was with goats, and in some with dairy cattle. The geographical distribution was very uneven; three of the 48 counties provided 61% of the cases. The district that supplied the majority of cases in this series was the major sheep-raising region of the State.

In the investigation of the significance of animal contact, serological surveys proved very informative. Lennette, Dean *et alii* (1951) reported the results of testing 16,000 animal sera for "Q" fever antibodies. Some of the results are abstracted in Table I.

From these surveys certain conclusions may be drawn: (i) A much higher proportion of infected sheep was found on ranches where human cases had occurred. This showed that ovine, like human, infection was focal in distribution, and that ovine and human foci were linked together. (ii) There was a similar relation in regard to goat dairies, although considerably fewer localities were involved. (iii) Except in two counties, the association of human cases with dairy cattle in Northern California was negligible. (iv) Sheep in Northern California appear to play an epidemiological role analogous to that of dairy cattle in Southern California.

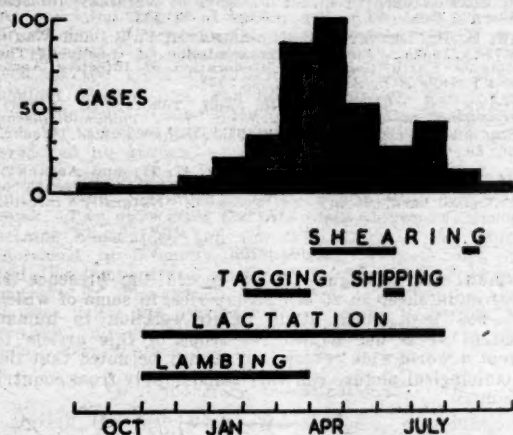


FIGURE 1.

Monthly distribution of cases in Northern California for the two years 1948 and 1949 (reproduced by kind permission of the American Journal of Hygiene from Clark, Lennette and Romer, 1951) compared with events in the sheep calendar in the study area (Abinanti *et alii*, 1955).

In Figure 1, the temporal distribution of human cases is compared with the events in the calendar of sheep husbandry. (It must be kept in mind that the cases not only include those associated with sheep, but also those associated with cattle and goats as well as those with no apparent animal contact.) The following comments may be made.

1. The occurrence of cases on ranches during or shortly after the lambing season (November to March) is accounted for by the high infectivity of some sheep at parturition. Lambing usually takes place in small

opportunities for infection. In the area studied, these activities include (Abinanti *et alii*, 1955) marking, docking and castration of lambs at four to six weeks after birth; crutching or "tagging" (February, March); complete shearing (April 1 to June 15); another shearing in late August because of irritation of the sheep from burrs and grass seeds in the wool; drafting out fat lambs and "shipping" them away for sale (mid-June). Collectively, these activities cover practically all the period at risk.

3. The peak incidence in April may be explained by a build-up of infectivity during the lambing season, perhaps by an increased risk associated with crutching, and by the ending of the rainy season (November to April). With drier weather, aerosol production is facilitated, and increased traffic between ranch and town may distribute rickettsiae more widely. Thereafter, there is a decline in the infectivity of sheep and environment, because of shearing, exposure to rain and ultraviolet irradiation, and the passage of time.

4. The correspondence between the distribution of cases and the period of lactation appears to be purely incidental. Infected milk has a comparatively low infectivity, and its opportunities for dispersion are very limited.

5. Shearing in California carries an occupational risk of "Q" fever. Abinanti *et alii* (1955) report three cases in shearers, also one in a man who collected and baled wool and one in a wool buyer. These men became ill in April and May. They further found that the incidence of antibodies to *C. burnetii* was ten times greater in shearers than in the general population of the area.

It is relevant here to recall the outbreak of about 30 cases of "Q" fever in a Philadelphia factory processing wool and goat hair (Sigel *et alii*, 1950).

The careful study of the following two outbreaks drew attention to the occurrence of human infection without direct contact with livestock.

Clark, Bogucki *et alii* (1951) reported 68 cases in a college of agriculture between February and May, 1948. The source of infection was traced to the college sheep. *C. burnetii* was isolated from their milk and excreta, and 65% possessed serum antibodies. Contact with infected animals could explain at most about 70% of cases; for many, the apparent mechanism was the inhalation of infected dust. The weather was unusually dry, prevailing winds blew from the live-stock barns across the campus, and the classrooms and halls of residence were extremely dusty.

A year later, an outbreak occurred in the rural town of Colusa (Clark, Romer *et alii*, 1951). Around this town of 3000 people are many sheep ranches; a sampling of sheep on these showed 10.5% to be serologically positive to *C. burnetii*. No infection was detected in local dairy herds. From February to April, 1949, there were 41 cases. Unusual features were the diversity of occupations (33 were represented), and the rarity of a history of direct contact with livestock. However, many patients had visited potentially contaminated environments. Many others, like salesmen, barbers and bartenders, worked in the business centre of the town, where they met daily a considerable number of people. Their infection probably arose from rickettsiae liberated into the "microenvironment" of office or shop from the clothing or hair of ranch workers. Definite instances of the conveyance of "Q" fever by contaminated clothing have been reported elsewhere, and in Britain, Marmion and Stoker (1956) have isolated *C. burnetii* from dust aspirated from the clothing of a shepherd. That only one of the 41 Colusa patients was female indicates that the outbreak was not due to a widespread urban distribution of infected dust, but the possibility exists that air in a town could carry rickettsiae blown from contaminated fields or roadways.

Summary.

In Northern California, sheep are the main source of human "Q" fever. The infection is enzootic in many flocks. In a few areas, cattle and goats provide the source.

TABLE 1.

Percentage of Animal Sera Fixing Complement at 1:8.

Animals.	Northern California.		Southern California. Associated with Human Cases.
	General Population.	Associated with Human Cases.	
Sheep	4	28	—
Goats	1	34	—
Dairy cattle	3	9	25

"lambing sheds" or on small plots of pasturage, which could become highly contaminated by placentas and faeces.

2. Cases occurring on the ranch after April are explained by the ability of *C. burnetii* to persist for months after parturition on sheep or in the environment. When the sheep are handled or the environment disturbed, secondary aerosols may be created. The series of activities subsequent to lambing could thus provide repeated

There is no evidence to incriminate native animals or arthropods.

An infected sheep shows no outward signs of infection, and rarely excretes rickettsiae except at and shortly after parturition. Placentas are the most abundant source of rickettsiae, followed by birth fluids, faeces and milk.

The high resistance of *C. burneti* to heat and desiccation allows it to survive for a prolonged period at the site of origin or on transported material.

Man becomes infected by the inhalation of infected aerosols. These may be generated under various conditions. Thus infection may arise:

1. On ranches during the lambing period, from proximity to post-partum sheep.
2. On ranches at a later date, from activities such as crutching, shearing, drafting, which disturb rickettsiae which have persisted locally on wool, soil, etc.
3. Among persons not directly associated with sheep, by inhalation of dust blown from premises, fields or roadways contaminated by sheep.
4. In wool stores or processing plants remote from the ranch, from rickettsiae carried on wool.
5. In shops or offices in pastoral towns, into which rickettsiae have been carried on the clothing or hair of ranch workers.

Acknowledgement.

The reviewer is greatly indebted to Dr. E. H. Lennette, Chief, Viral and Rickettsial Disease Laboratory, Berkeley, California, for much advice and for his generosity in making available work not yet published.

References.

- ABINANTI, F. R., LENNETTE, E. H., WINN, J. F., and WELSH, H. H. (1958), "Q Fever Studies. XVIII. Presence of *Coxiella burnetii* in the Birth Fluids of Naturally Infected Sheep", *Amer. J. Hyg.*, 58:385.
- ABINANTI, F. R., WELSH, H. H., LENNETTE, E. H., and BRUNNETT, O. (1953), "Q Fever Studies. XVI. Some Aspects of the Experimental Infection Induced in Sheep by the Intratracheal Route of Inoculation", *Amer. J. Hyg.*, 57:170.
- ABINANTI, F. R., WELSH, H. H., WINN, J. F., and LENNETTE, E. H. (1955), "Q Fever Studies. XIX. Presence and Epidemiologic Significance of *Coxiella burnetii* in Sheep Wool", *Amer. J. Hyg.*, 61:362.
- CAMINOPETROS, J. (1948), "Q Fever, a Respiratory Human Epidemic Disease in the Mediterranean Area, Determined a Milk-Borne Infection from Goats and Sheep", *Proceedings of the Fourth International Congress on Tropical Medicine and Malaria*, Washington: 441.
- CLARK, W. H., BOGUCKI, A. S., LENNETTE, E. H., DEAN, B. H., and WALKER, J. R. (1951), "Q Fever in California. VI. Description of an Epidemic Occurring at Davis, California, in 1948", *Amer. J. Hyg.*, 54:15.
- CLARK, W. H., LENNETTE, E. H., and ROMER, M. S. (1951), "Q Fever in California. XI. An Epidemiologic Summary of 350 Cases Occurring in Northern California during 1948-1949", *Amer. J. Hyg.*, 54:319.
- CLARK, W. H., ROMER, M. S., HOLMES, M. A., WELSH, H. H., LENNETTE, E. H., and ABINANTI, F. R. (1951), "Q Fever in California. VIII. An Epidemic of Q Fever in a Small Rural Community in Northern California", *Amer. J. Hyg.*, 54:25.
- DELAY, P. D., LENNETTE, E. H., and DROME, K. B. (1950), "Q Fever in California. II. Recovery of *Coxiella burnetii* from Naturally-Infected Air-Borne Dust", *J. Immunol.*, 65:211.
- DERRICK, E. H., POPE, J. H., and SMITH, D. J. W. (1959), "Outbreaks of 'Q' Fever in Queensland Associated with Sheep", *Med. J. Aust.*, 1:585.
- JELLISON, W. L., WELSH, H. H., ELSON, B. E., and HUEBNER, R. J. (1950), "Q Fever Studies in Southern California. XI. Recovery of *Coxiella burnetii* from Milk of Sheep", *Publ. Hlth. Rep. (Wash.)*, 65:395.
- KAPLAN, M. M., and BERTAGNA, P. (1955), "The Geographical Distribution of Q Fever", *Bull. Wld. Hlth. Org.*, 13:829.
- LENNETTE, E. H., CLARK, W. H., and DEAN, B. H. (1949), "Sheep and Goats in the Epidemiology of Q Fever in Northern California", *Amer. J. trop. Med.*, 29:527.
- LENNETTE, E. H., DEAN, B. H., ABINANTI, F. R., CLARK, W. H., WINN, J. F., and HOLMES, M. A. (1951), "Q Fever in California. V. Serologic Survey of Sheep, Goats and Cattle in Three Epidemiologic Categories, from Several Geographic Areas", *Amer. J. Hyg.*, 54:1.
- LENNETTE, E. H., HOLMES, M. A., and ABINANTI, F. R. (1952), "Q Fever Studies. XIV. Observations on the Pathogenesis of the Experimental Infection Induced in Sheep by the Intravenous Route", *Amer. J. Hyg.*, 55:254.
- LENNETTE, E. H., and WELSH, H. H. (1958), personal communication.
- MARMION, B. P., and STOKER, M. G. P. (1956), "The Varying Epidemiology of Q Fever in the South-east Region of Great Britain. II. In Two Rural Areas", *J. Hyg. (Lond.)*, 54:547.
- SIGEL, M. M., SCOTT, T. F., MCN., HENLE, W., and JANTON, O. H. (1950), "Q Fever in a Wool and Hair Processing Plant", *Amer. J. publ. Hlth.*, 40:524.
- WELSH, H. H., LENNETTE, E. H., ABINANTI, F. R., and WINN, J. F. (1951), "Q Fever in California. IV. Occurrence of *Coxiella burnetii* in the Placenta of Naturally Infected Sheep", *Publ. Hlth. Rep. (Wash.)*, 66:1473.
- WELSH, H. H., LENNETTE, E. H., ABINANTI, F. R., and WINN, J. F. (1958), "Air-Borne Transmission of Q Fever: The Role of Parturition in the Generation of Infective Aerosols", *Ann. N.Y. Acad. Sci.*, 70:528.
- WIESMANN, E., SCHWELZER, R., and TOBLER, H. (1956), "Q-Fieber in der Nordostschweiz. Eine epidemiologische Studie aus dem Winter 1954-1955", *Schweiz. med. Wschr.*, 86:60.
- WINN, J. F., LENNETTE, E. H., WELSH, H. H., and ABINANTI, F. R. (1953), "Q Fever studies. XVII. Presence of *Coxiella burnetii* in the Faeces of Naturally Infected Sheep", *Amer. J. Hyg.*, 58:183.

Addendum.

Kaplan and Bertagna (1955) record the presence of "Q" fever in sheep in 25 other countries, in some of which there has been much study of its relation to human infection. It is not within the scope of this article to attempt a world-wide review, but it may be noted that the epidemiological picture can vary considerably from country to country.

A FATAL CASE OF "Q" FEVER ASSOCIATED WITH HEPATIC NECROSIS.

By J. I. TONGE,

Laboratory of Microbiology and Pathology,
Brisbane,

AND

E. H. DERRICK,

Queensland Institute of Medical Research,
Brisbane.

THE following fatal case of "Q" fever is reported because of the scarcity of published autopsy records in this disease. The outstanding post-mortem feature was the intense necrosis of the liver.

At the time of the death of the patient, 12 years ago, the case was the two hundred and seventy-third to be diagnosed as "Q" fever in Queensland since 1935, and the fourth patient in the series whose illness ended in death.

Clinical Record.

The patient, a man aged 52 years, had been employed at the abattoirs for about 36 years. Most of that time he had worked in the Casing Department, handling pig and sheep intestines, and recently had acted as supervisor. He was said to have had a peptic ulcer for eight years. He had had recurrent attacks of a fever, which he called "dengue", which would occur three or four times each year, and necessitate his remaining in bed for about a week. During these attacks, he would be extremely irritable, "go a bit mental" and "become sallow".

On June 14, 1947, he had been out fishing for the day, and in the evening developed a generalized aching of the muscles and joints, severe headache, malaise, dyspnoea and slight photophobia, and these symptoms persisted until he was admitted to hospital five days later. On examination, the patient was well nourished, and his colour was normal. His blood pressure was 145/96 mm. of mercury, and the heart sounds were

normal. The respiration was rapid and sighing, and crepitations were heard at the right lung base. There was slight tenderness in the right hypochondrium. His temperature on admission to hospital was 102.5° F., he was coughing and he complained constantly of a severe headache.

For the next six days, the headache persisted, and the temperature fluctuated between 99° and 103° F., despite penicillin and sulphadiazine therapy. During that period, he was extremely restless, and on occasions appeared delirious. On June 25, six days after his admission to hospital, a mass was noted in the right hypochondrium, and a laparotomy was performed under ether anaesthesia. At operation, the liver appeared swollen, and a "necrotic area" about 2.5 cm. in diameter was seen on the surface of the right lobe of the liver on the anterior border just to the right of the ligamentum teres. The gall bladder was normal, and no other lesion was found in the abdomen. Swabs were taken from the necrotic area, but no amebae were found, and attempts at culture produced no growth.

After the operation, penicillin and intravenous glucose-saline were continued. The patient was drowsy and weak. Two days after the laparotomy, June 27, the urine became bile-stained and the skin icteric. The jaundice increased in intensity, slight neck stiffness was noted and the temperature continued to fluctuate between 99° and 101° F. The patient was distressed, twitching, unable to pass urine and dyspnoeic. The weakness became more marked, and death occurred on June 30, on the seventeenth day of his illness.

Laboratory Investigations.

During the last week of his illness, examination of his urine showed a heavy albuminuria, microscopic haematuria, and granular and hyaline casts were numerous in the centrifuged deposit. On June 22, there was a leucocytosis of 13,300 per cubic millimetre, with 77% neutrophils. The urinary diastase index was 32 units. Two days prior to death, the haemoglobin value was 75%, serum protein content 5.7 grammes per 100 ml. of serum, and the urea content 247 mg. per 100 ml. of blood.

On June 27, three days prior to death, a specimen of urine was submitted to the Laboratory of Microbiology and Pathology, and was inoculated into a guinea-pig. This guinea-pig gave a slight febrile reaction on the eleventh day, and was killed on the fourteenth day. When an autopsy was performed on the animal, a small subcutaneous abscess was found. The organs were inoculated into a second guinea-pig, which became febrile on the eighth day and, whilst still febrile, it was killed on the tenth day. At autopsy, its spleen was found to be enlarged. The organs from this animal were inoculated into seven guinea-pigs and two mice. All of these guinea-pigs gave a febrile reaction, and the infective agent was maintained for a total of six passages, after which it died out due to an intercurrent infection in the animal colony. The strain was being maintained for cross immunity tests, but unfortunately no other strain of *Coxiella burnetii* was available at the time. The mice inoculated from the second guinea-pig passage showed rickettsiae characteristic of *C. burnetii* in both liver and spleen, and these were found in two further passages after which further passage was discontinued.

Three specimens of serum from the patient collected on the fifth, eleventh and seventeenth days of illness respectively were examined by the agglutination test for *C. burnetii*. No agglutination was demonstrated in the first two specimens, but a rise to complete agglutination in a titre of 1:60 was obtained in the third serum. Widal, Weil-Felix and agglutination tests with *Brucella abortus* gave negative results in all three, as also agglutination-lysis tests with *Leptospira icterohaemorrhagiae*, *L. hyos* and *L. pomona*—the three leptospiral serotypes known to cause leptospirosis in Brisbane.

Autopsy Findings.

The post-mortem examination was performed thirteen and a half hours after death. The body was of medium

build, and the nutrition was good. The whole body was deeply jaundiced, and this was particularly evident in the conjunctivae. A right paramedian surgical incision, closed by interrupted sutures, appeared free of infection. The brain weighed 1636 grammes. Both the meninges and the brain were icteric. Numerous small petechial haemorrhages were scattered throughout both cerebral hemispheres and in the pons. The lenticular nuclei were a faint yellow colour. There was a doubtful area of softening near the right internal capsule. The cerebral vessels appeared normal.

The heart weighed 356 grammes. The myocardium had a "toxic" glassy appearance, and was mottled brown and red in colour, but no petechial haemorrhages could be seen. The lungs revealed consolidation of all lobes, and their cut surface appeared congested and oedematous. The stomach was distended with bile-stained fluid, the mucosa was icteric and the mucosal folds were swollen and contained patchy areas of petechial haemorrhages. No ulceration was present in the stomach or duodenum. The liver (2296 grammes) was enlarged, soft and icteric. The normal lobular pattern was somewhat obscured. On the surface of the liver there was a small yellow calcified nodule about 4 mm. in diameter. No abnormality was observed in the gall bladder or common bile duct. Occasional petechial haemorrhages were seen in the ileum. The suprarenal glands were soft, swollen and "toxic", and the spleen (170 grammes) was soft, "toxic", friable and semi-fluid.

The right kidney measured 10 by 5 by 2.5 cm., and weighed 85 grammes; the left kidney measured 14 by 7.5 by 2 cm., and weighed 325 grammes. Both were soft and "toxic". The capsules were slightly adherent, and their removal exposed granular surfaces, which were mottled yellowish-brown and dark red. In some areas the appearance was frankly haemorrhagic. The cortex of the kidneys was swollen. No significant pathological change was noted in the other organs.

Histopathological Findings.

In sections from both the frontal and the occipital cortex, some proliferation of fixed tissue cells was seen in the meninges. A few perivascular cells were evident in the subcortical white matter. Macrophages containing blood pigment were scattered around some vessels in both the parenchyma and the leptomeninges. An occasional classical brain purpuric spot was present, consisting of a small area of perivascular necrosis, outside which was a zone of extravasated red cells forming a ring haemorrhage. In one section from the basal ganglia, there was a clear-cut cellular nodule, consisting of mononuclears and microglia intermingled with red cells, and it was perivascular in position. It appeared to be a reaction to damaged perivascular parenchyma. In the thalamus there was a discrete zone of necrosis with associated petechial haemorrhage, as well as perivascular cuffing with mononuclear cells and numerous small haemorrhages. In the cerebellum numerous classical brain purpuric spots were seen. These foci were of recent origin, since there was no evidence of glial proliferation or repair. Small petechial haemorrhages were fairly numerous. In the region of the dentate nucleus, perivascular cellular infiltration, several brain purpuric spots with ring haemorrhages and an occasional cellular nodule were all evident. In both pons and medulla, areas of necrosis and associated ring haemorrhages were numerous, as well as marked perivascular cuffing with mononuclear cells and macrophages containing iron pigment. The cervical cord revealed only slight fixed tissue cell proliferation in the meninges. The pituitary was normal.

In both lungs there was marked interstitial pneumonia. The alveolar walls were congested and infiltrated with mononuclears, polymorphs, numerous pigment-laden macrophages, and fibrin. Both interstitial and intra-alveolar haemorrhage had occurred in many areas. In several areas the inflammation involved the alveoli as well as the interstitial tissue, for groups of alveoli were packed with polymorphs, fibrin and large macrophages of the "heart failure cell" type. These macrophages were

scattered in most of the alveoli throughout the lungs. In some alveoli a hyaline lining membrane appeared to be developing. Oedema was inconspicuous. Marked inflammation was seen in and around the bronchi, and a striking feature was the degree of involvement of the terminal bronchioles. In the inflammatory infiltration, polymorphs were predominant, but plasma cells and mononuclears were also plentiful. The capillaries were engorged and increased in number. Clumps of pus cells, fibrin and desquamated epithelium lay within the lumen of the bronchioles.

There was extensive destruction of liver cells, and scarcely any normal liver cell cords could be seen. The supporting framework of reticular fibres remained, and the liver cells appeared discrete, being separated by oedematous interstitial tissue. Many liver cells appeared to be degenerating. This degeneration and disappearance of liver cells was not confined to any particular zone, but involved the entire lobule diffusely. Some of the liver cells in the region of the central vein appeared to have taken up bile pigment. Occasional polymorphs and mononuclear cells were scattered in the supporting stroma of the lobules. The sinusoids did not appear congested. There was marked perilobular inflammation, the infiltrating cells being polymorphs, plasma cells and lymphocytes. No bile duct proliferation, fatty change or fibrosis was apparent, and there were no visible areas of regeneration of liver cells.

There was acute bilateral focal interstitial nephritis, the infiltrating cells being plasma cells, lymphocytes and polymorphs. The glomeruli appeared normal, but tubular degeneration was widespread. In the cortex there were scattered areas of tubular degeneration, fibrosis and intense cellular infiltration with capillary dilatation. The cellular infiltration in the interstitial tissue tended to be focal in the cortex and more diffuse in the medulla. No significant abnormality could be seen in the renal vessels.

The follicles of the spleen appeared atrophic, with indistinct borders. Accumulations of polymorphs and plasma cells were present in the pulp and sinuses. Large mononuclear phagocytes were seen in both the pulp and the sinuses, and many appeared to be undergoing phagocytosis. Congestion was not conspicuous, but occasional small hemorrhages were evident. No significant pathological change could be seen in the thyroid, heart, adrenals or pancreas.

Despite prolonged examination, no *C. burneti* could be found in any of the sections stained by Giemsa's method.

Other Investigations.

Pieces of liver, kidney and spleen were taken at the autopsy, pooled and inoculated into two guinea-pigs. Both these guinea-pigs became febrile on the eleventh day. One was killed on the fourteenth day, but failed to show anything abnormal *post mortem*. The organs from these guinea-pigs were passed into two more guinea-pigs, both of which gave febrile reactions, which in one case lasted one day and in the other four days. These guinea-pigs were retained for cross-immunity tests, but unfortunately at the time no other strain of *C. burneti* was available for this to be carried out.

Discussion.

The patient's final illness was due, wholly or partly, to an acute infection with *C. burneti*. This diagnosis was established by the demonstration in mice of the characteristic rickettsiae derived from his urine, and by the development of specific agglutinins in his serum. Guinea-pigs inoculated with urine and liver-kidney-spleen produced febrile reactions consistent with "Q" fever, and this effect was manifest in repeated passages.

The lesions found *post mortem* were widespread. The most prominent, and probably the most lethal, was the extensive, diffuse necrosis of the liver. Other findings were acute interstitial nephritis, interstitial pneumonia, bronchopneumonia and encephalitis.

The question arises as to whether the liver damage was due solely to *C. burneti*, or whether other factors contributed. Decision is difficult on the evidence available. It has been pointed out by Clark *et alii* (1951) and Gerstl *et alii* (1956) in California, Douglas (1958) in Queensland, and others, that hepatic involvement is often associated with an attack of "Q" fever. The frequency of this association suggests a causal relation.

However, there are several other possibilities. The virus of infective hepatitis periodically circulates through the community, and it is conceivable, although statistically unlikely, that the patient suffered from a simultaneous infection with this virus. An example of the production of hepatic necrosis in mice by the combined action of two infecting agents is reported by Niven *et alii* (1952). Mice carrying the mouse hepatitis virus show no symptoms, but if additionally infected with *Eperythrozoon coccoides* (which is now classified by Bergey in the Order Rickettsiales) may die with hepatic necrosis. Gledhill and Dick (1955) speculate whether a human analogy to this mouse phenomenon may exist.

Hepatitis of leptospiral origin was excluded by the serological tests.

This case occurred before the era of broad-spectrum antibiotics, and was treated, *inter alia*, with sulphadiazine. On very rare occasions liver damage has followed the use of sulphadiazine. Plummer and Wheeler (1944) reported jaundice in two of 1357 cases treated with it, and Herbut and Scaricaciottoli (1945) described two fatal cases of acute diffuse hepatic necrosis which they considered were caused by it.

The histological appearance of the patient's liver did not assist aetiologicaly. The findings of diffuse necrosis with cellular reaction are similar to those in acutely fatal viral hepatitis (Anderson, 1953) and in Herbut and Scaricaciottoli's patients after sulphadiazine. Gerstl *et alii* used needle biopsy to study the liver in the acute stage in two non-fatal cases of "Q" fever. They noted numerous focal areas of inflammation. However, this is not inconsistent with the present finding. One may conceive that an injurious agent acting mildly might cause necrosis of isolated groups of hepatic cells followed by a focal cellular reaction, whereas if it acted severely the necrosis and cellular reaction might be general.

It is noteworthy that in acutely fatal viral hepatitis, the liver is much decreased in size, whereas in the case reported here, the patient's liver was much enlarged. The liver in one of Herbut and Scaricaciottoli's cases was reduced to 880 grammes, in the other was just above normal (for a female) at 1450 grammes. Differences in size are probably not fundamental, but might be explained by differences in the intensity and duration of the necrotizing process.

The nature of the periodic attacks of "fever", which the patient described in his past history, remains obscure. They were not a manifestation of "Q" fever, for there were no antibodies in the first two specimens of serum examined. Periodic fever is not characteristic of infective hepatitis, and there was no histological evidence of fibrosis to suggest long-standing liver disease. The attacks were possibly digestive upsets, and probably unrelated to the final illness.

Summary.

A meatworker, aged 52 years, developed an acute attack of "Q" fever. Enlargement of the liver appeared on the twelfth day, and jaundice on the fourteenth. He died on the seventeenth day. Autopsy showed very extensive necrosis of the liver. It is uncertain to what extent this was due to *C. burneti*. There were also acute inflammatory lesions in the lung, brain and kidney.

Acknowledgements.

We are indebted to the staff of the Mater Misericordiae Hospital, Brisbane, for the clinical notes, and to Mr. H. E. Brown and Mr. D. J. W. Smith for the biological investigations.

References.

- ANDERSON, W. A. D. (1953), "Pathology", 2nd Edition, Mosby, St. Louis.
- CLARK, W. H., LENNETTE, E. H., RAILEBACK, O. C., and ROMER, M. S. (1951), "Q Fever in California. VII. Clinical Features in One Hundred Eighty Cases", *A.M.A. Arch. Intern. Med.*, 88:155.
- DOUGLAS, R. A. (1958), "Hepatitis in 'Q' Fever with Reports of Four Cases", *Med. J. Aust.*, 1:739.
- GERSTL, B., MOVITT, E. R., and SKAHEN, J. R. (1956), "Liver Function and Morphology in 'Q' Fever", *Gastroenterology*, 30:813.
- GLEDHILL, A. W., and DICK, G. W. A. (1955), "The Nature of Mouse Hepatitis Virus Infection in Weanling Mice", *J. Path. Bact.*, 69:311.
- HERBUT, P. A., and SCARICACIOTTOLI, T. M. (1945), "Diffuse Hepatic Necrosis Caused by Sulfadiazine", *Arch. Path.*, 40:94.
- NIVEN, J. S. F., GLEDHILL, A. W., DICK, G. W. A., and ANDREWS, C. H. (1952), "Further Light on Mouse Hepatitis", *Lancet*, 2:1061.
- PLUMMER, N., and WHEELER, C. (1944), "The Toxicity of Sulfadiazine: Observations on 1357 Cases", *Amer. J. med. Sci.*, 207:175.

ASIAN INFLUENZA IN BRISBANE

By P. E. LEE,

Queensland Institute of Medical Research, Brisbane.

ASIAN INFLUENZA first made its appearance in North China, and reached Singapore in May, 1957 (Lim *et alii*, 1957). In the same month a passenger from Singapore arrived in Brisbane with a mild febrile illness. Although no virus was isolated from her throat washing, the episode initiated a limited survey of throat washings and sera (mostly paired) from selected local patients with respiratory illness.

The serological response of a number of hospital staff vaccinated about one month before with a vaccine prepared against Asian influenza A was also investigated.

Materials and Methods.

Isolation of Virus.

The majority of inoculations were made into 12 to 14 day-old chick embryos by the amniotic route, but 10 to 12 day-old embryos were used in the initial part of the investigation. Throat washings were clarified, if necessary, by centrifugation, and 500 units of streptomycin and 1500 units of penicillin per millilitre were added before inoculation.

Serology.

The haemagglutination-inhibition test utilizing fowl red cells was used for the detection of antibody. All sera were stored at -20°C. until used. Non-specific inhibitors were removed by treatment with cholera filtrate prepared as described by Ada and French, 1957.

Strains of virus used include A/Singapore/57/Fat (Asian virus—current strain), A/WA/43/56M (Netherlands virus—predominant in 1956), FM1 A, PR8 A and LEE B. Infected allantoic fluids were used as antigens.

Results.

Isolation of Virus.

Specimens of lung and trachea from one person and lung from another who had died with respiratory involvement, and 33 throat washings from persons with respiratory illness were examined. Only two strains of virus were isolated—one from the throat washing of a National Service trainee, whose paired sera gave a significant rise in antibody titre to Singapore virus, and one from the post-mortem specimen of trachea. Haemagglutination-inhibition tests with known antisera indicated that these were Asian type viruses. The "positive" throat washing was collected on July 16, 1957, and the "positive" trachea on August 16. The last specimen in this series to be examined was collected on August 23.

Serology.

The results of testing paired sera from 28 patients with influenza-like illnesses against a known Asian virus (A/Singapore/57/Fat) are shown in Table I. In addition to those with rising titres, one of the patients with suspected encephalitis and one of the miscellaneous group had high stationary titres (1:640 and 1:80) indicative of recent infection. The earliest serum to show antibodies to the Singapore virus was collected on July 12, 1957. These results indicate that the Asian virus was prevalent in the community during the winter of 1957.

Single sera were also examined from two National Service trainees and five hospital staff with respiratory infections, and from 21 healthy subjects. None showed antibodies to the Singapore virus.

TABLE I.
Paired Sera from Persons with Influenza-like Illnesses.

Group.	Number Tested.	Number with Significant Rise in Titre to Singapore Virus.
National Service trainees ..	11	10
Staff of Brisbane Hospital ..	7	4
Persons with suspected post-influenza encephalitis ..	3	1
Miscellaneous ..	7	0
Total ..	28	15

Twenty-eight people in the series (two with illness and rising titres in their sera, the five with illness and single sera and the 21 healthy subjects) had been vaccinated against Asian virus. The only possible indication of serological response was an initial titre of 1:5 in one of the paired sera.

Sera from 34 of the 56 subjects tested contained antibodies to Netherlands virus, but none of the paired sera tested gave any indication of rising titres. Paired sera from 13 patients, which failed to give significant reactions against Asian and Netherlands viruses, also failed to give any rise in titre when further tested against FM1 A, PR8 A and LEE B viruses. This suggests either that some other infecting agent was present or that these patients had a very poor immune response.

Summary.

The presence of Asian influenza in Brisbane during the winter of 1957 was demonstrated by isolation of two strains of the virus (one from the throat washing of a National Service trainee, and one from a post-mortem specimen of trachea), by a significant rise in antibody titre in paired sera from 15 of 28 patients with respiratory illness, and by high stationary titres in two of the patients. The earliest serum to show antibodies to the Asian virus was collected on July 12, 1957, and the first isolation was made from a throat washing collected on July 16.

Serological testing of paired sera proved to be a much more reliable method of diagnosis than virus isolation.

Antibodies to Netherlands virus, which had predominated in 1956, were demonstrated in 34 patients tested, but rising titres were not found against this virus, PR8 A, FM1 A or LEE B.

No antibody response was detected in 28 persons vaccinated against the Asian virus about one month previously. Eight of these had respiratory illnesses, and two of them subsequently developed significantly rising antibody titres to this virus.

Acknowledgements.

I am indebted to Dr. L. C. Rowan, of the Commonwealth Serum Laboratories, for supplying strains of

Asian and Netherlands virus and ferret immune serum, and to Dr. E. L. French, of the Walter and Eliza Hall Institute for supplying cholera filtrate for the treatment of sera and for confirming the identity of the viruses isolated. I am also grateful to the many people whose assistance in the collection of specimens made this work possible.

References.

- ADA, G. L., and FRENCH, E. L. (1957), "Stimulation of Production of the Receptor Destroying Enzyme (R.D.E.) of *V. cholerae* by Neuraminic Acid Derivatives", *Aust. J. Sci.*, 19:227.
- LIM, K. A., SMITH, A., HALE, J. H., and GLASS, J. (1957), "Influenza Outbreak in Singapore", *Lancet*, 2:791.

INSOMNIA.

By **BARBY MULVANY**,
London.

A fellow also, with a bundle of straw for my bed, attended, who led me along a dark narrow passage into a room paved like the common prison, and in one corner of this I spread my bed and the clothes given me by my fellow prisoner, which done, my conductor, who was civil enough, bade me good night. After my usual meditations, and having praised my heavenly corrector, I laid myself down and slept with the utmost tranquillity till morning.

—The Vicar of Wakefield.

(His first night in prison as a debtor.)

In any consideration of insomnia, it is essential, at the outset, to separate off the symptomatic insomnias. Insomnia can arise secondarily to any condition in general medicine and surgery. The universal prescription of hypnotics in hospitals is seldom challenged. In the past year, the National Health Service of Great Britain spent £1,600,000 on barbiturates alone. In Britain there are half a million known epileptics. Hence if the legitimate and specific indications for the use of this drug are deducted from its widespread uses, there remain strong *a priori* grounds for questioning the advisability of its wholesale consumption.

The symptomatic insomnias may arise from pain, discomfort, restlessness due to physical causes such as anoxia or hypoglycemia, pruritis and many other organic pathological conditions. Unfortunately, the practitioner does not sift the causation, but prescribes without question some hypnotic. This step should be the last step and not the first.

In recent decades, orthopaedic units have referred many patients to the psychiatrist. The thyroidectomy scar of two decades earlier has given way to the orthopaedic surgical scar. It is most instructive to examine an orthopaedic ward between the hours of 9 p.m. and 10 p.m. on any night. It is a truism of modern times that development has outstripped appreciation. No one doubts the great developments of modern medicine and surgery, but what is a good result to the orthopaedic surgeon is often a poor result to the patient and his relatives, and to the insurance company. Sleep does not come easily to patients in the orthopaedic ward. The long-term prescription of hypnotic drugs produces increasing tolerance of and dependency upon them.

If the surgeon or the physician took cognizance of the total situation of his patient, simple measures might cancel the need for the increasing consumption of hypnotics. The numerous confusional states, often nocturnal, which punctuate many medical and surgical conditions, should not be treated by hypnotics until all other measures have been tried. Many of these conditions are nocturnal simply because the patient is left in the dark or in a dimly lit room and deprived of the use of his dominant sense—vision. For some extraordinary reason, the traditions persist in nursing that the best means of getting a patient to sleep is to give him hypnotics and to turn the light low. For a confused patient nothing could be further from the truth. Such a patient, deprived of points of visual reference, becomes infinitely worse.

He should be nursed in a room lit to a degree of illumination close to that of daylight. This applies also to patients with the confusion associated with cardiac failure, and to all the toxic confusional states, no matter how mild. It is imperative in the management of confused children. Under such a degree of illumination the patient will often doze without a sedative. Darkness and gloom allow visual hallucinatory and illusory phenomena to flourish and terrify the sufferer. They are frequently suppressed when he has points of visual reference in a well-illuminated room.

There are many pathological processes and possibilities which must be explored before insomnia is accepted as a primary condition. It is an astonishing commentary on academic medicine and the rise of the so-called teaching hospitals that a vast heterogeneous mass of knowledge is acquired and never applied. This is brought home with vigour to the practitioner in a general psychiatric practice, who is called to treat the insomnia of a patient with anaemia or to treat the insomnia associated with the rare painless cardiac infarction or with the less rare cerebral tumour. In the long prodromal period of tuberculous meningitis of adults, a neuroathentic picture with insomnia and restlessness is quite common. All errors stem from the prevailing medical belief that insomnia exists *per se* and that its treatment must include hypnotics. In the oldest group of patients, much thought must be spent upon possible causation before anything is done. Most hypnotic drugs procure sleep at the expense of increasing confusion. This applies with special force to the senile patient, and indeed to any patient whose metabolism is disturbed.

Thus the symptomatic insomnias invite detailed consideration from the practitioner, and any case of insomnia is symptomatic until proved otherwise. It is probably true that all cases of insomnia are symptomatic, but in practice this view is not currently accepted. This latter observation is reinforced by the widespread and indiscriminate use of hypnotics. One must bow to current usage, and the process of weaning the public from the use of these drugs is going to be slow.

It is not sufficiently realized that sleeping habits vary with individuals. Meyer thought that there were two main types of sleepers. One type fell asleep quickly and slept heavily for the first half of the night; the other slept lightly for the first half of the night and heavily for the second. This is probably an over-simplification. There are individuals who seem to sleep more heavily in the middle third of the night. In other words, Meyer's distinction, in the light of experience, has to be modified to include intergrades. This is the fate of much dogma in academic medicine.

The rapidity with which depth of sleep is achieved is of interest to the clinical psychiatrist. In endogenous depression, the patient tends to fall asleep early and wake very early. In reactive depression the reverse tends to be true. The latter patient falls asleep late, sleeps late and wakes exhausted. Such clinical findings arouse considerable speculation as to the relationship between depression, sleep and Pavlov's concept of inhibition. Children are often excitable in the hour before sleep, but this state passes over quickly into sleep. Excitation can do this in unusual circumstances. During the second World War, the writer encountered cases in which individuals went to sleep in situations of extreme danger. They were not narcoleptic.

If the two main types of sleepers are accepted as such, then their retiring habits should be different. Recently, a group of patients suffering from insomnia were investigated and their retiring times were charted any time from 6 p.m. onwards. Their reasons for retiring were boredom and fatigue. Hypnotics had been prescribed for them over long periods. Other bogies concern the number of hours of sleep considered necessary, and the ludicrous contemporary fear that lack of sleep "will damage the brain".

Reassurance is most helpful on these points where the basis is clearly psychoneurotic. It is most harmful when the sufferer is an undiagnosed depressive psychotic, with

socially acceptable delusions about his body. In the latter case reassurance is sometimes rewarded by a first-class suicidal and/or homicidal tragedy. A disadvantage of the reassuring approach on the part of the practitioner is that much of it is retained by himself.

Lip service is still being paid by academic medicine to careful history taking, although the history cards of many doctors look more like laundry tickets. The history of a case of insomnia is all important: first, the onset and its setting; secondly, the development and its relevancy to external factors; thirdly, whether the course is periodic or sustained and whether there have been previous bouts. Then comes the sifting of factors comparable to that done by the allergist in his field. This is laborious but inescapable. During the last few years, the writer has been using a *questionnaire* especially constructed and of presentable format to cut such history-taking short. The vast majority of patients become totally absorbed in their answers, and in less than an hour a revealing life history is produced. This, then, forms the factual basis for the subsequent interview. Now the curious thing about this procedure is that it is really a tracing of the whole patient. It is what the patient says about himself. It has the force of an unsworn statement. Yet it seems to have less appeal to some clinicians than an electroencephalographic tracing over which they will pore for hours. Yet the electroencephalogram is a profile in one dimension only of a multi-dimensional problem. It casts no light on all important humoral factors. In a problem such as insomnia, nothing rational can be done without the patient's detailed account of himself and of his complaint. Some comments about history-taking are pertinent. What the patient says and writes about himself are facts; what somebody else says of the patient is hearsay. Hence all medical histories including those detailed at wearisome case conferences fall into this latter category. In law a double procedure is used. The written histories are used as a basis for verbal interrogation. Why the double procedure is not used in medicine is a mystery. It probably emanates from the defensive *de haut en bas* approach of many clinicians, and from the affected analytical façade of some psychotherapists. They cannot be told anything; they already know.

When insomnia appears to be a primary condition, the search for an underlying factor presents considerable difficulty. Psychogenic factors are now so well known that most clinicians go to them as a matter of course. The best person to investigate is the patient. There is a tendency today to go behind the patient's back and transact with a relative. Relatives do not like the patient; and they seldom like the doctor. It is a step which has done more harm to medical practice than the most doctrinaire politician.

The expansiveness of modern medicine has resulted in the recruiting of ancillaries, so that the modern family has learned to expect a social worker on the doorstep. Eventually, her findings present themselves in a report. So fast have these ancillary services snow-balled that their uncritical acceptance is established. Such a social history is not a fact in law; it is an opinion. It is no substitute for what the patient says and writes about himself. A good social worker can be valuable, provided the clinician sifts and restricts her findings to matters of fact.

Where insomnia appears to be a primary and presenting symptom, psychogenic factors and some form of psychotherapy are indicated. In the majority of cases, it can be done by the general practitioner if he has the time and the inclination. Recourse to more complicated procedures in psychiatry is a step which should be weighed carefully. The current popular appeal of psychiatric services is based on false premises. Psychiatric treatment is not a good thing, any more than popular and widespread surgery would be a good thing. The findings of the Australian delegation which went to China some time ago make an interesting comparison with a recent British socialist delegation to the Soviet Union. It is stated that 50% of the attenders at the Soviet polyclinics are "nervous" problems. The Chinese concentrate on the

well-defined disorders, and do not convert psychopathological concepts into a morale-destroying ideology. With China's population increasing at a rate of 15 millions per year, Australia might well ponder the bovineities of her psychiatrists and their flock of ancillaries. Recourse to psychiatry is often precisely what the sufferer from insomnia desires.

In the last five years there has been a lamentable increase in the number of psychoneurotic patients, particularly housewives, in the newer wards attached to mental hospitals. None of them can sleep. The removal of the psychoneurotic patient from the situation in which the symptoms developed is a grave step. It renders dubious the return and the full resumption of marital and domestic duties in the future. Early in the Spanish Civil War, Mira of Barcelona rejected the offer of beds for psychiatric casualty patients because he believed that the readiness of beds would multiply the psychoneuroses.

The fundamental principle of full employment within the limits of individual capacity, close to the situation in which the symptoms developed, is a *sine qua non* of clinical psychiatry in the treatment of the psychoneuroses. This does not apply, of course, to the schizophrenias, the affective psychoses or the psychoses with epilepsy despite the ludicrous euphoria of some contemporary clinicians with what they call "the total push". The paradox is that they put the psychoneurotic subjects to bed, and subject the endogenous psychotic subjects to social, psychological and occupational "pushes".

The rising consumption of hypnotics is not the only therapeutic problem. It is often allied to the prescription of stimulants, which last for six to eight hours and pave the way to another sleepless night. Their discontinuance is a useful step. Dominating the stimulants is the extremely common sensitivity to caffeine. In any case of insomnia, all tea and coffee should be banned after 12 noon. In some cases of insomnia, it is prudent to ban them altogether for several days. In an expensive private psychiatric unit abroad, the writer observed six servings of tea or coffee per day. The patients' consumption was between 12 and 18 cups per day. The hypnotic dosage was such that the night staff were seldom disturbed, but the retarded and ataxic performance of the patients in the morning was noteworthy. There is wide variation in the personal susceptibility to caffeine, but its exclusion is the most important single step in the treatment of insomnia. It is no use banning tea and coffee unless other drinks are substituted at the expected times. It is important to give drinks with a high glucose content, particularly at night, and the gibe at the commercial directive based on this point is misplaced.

There seems to be a compulsive trait in the practitioner who must put his patients to sleep. Several sleepless nights will often cure insomnia if the cooperation of all concerned is forthcoming. It seldom is, and other patients boast of their sedation.

In contrast with the enormous expenditure of hospitals upon sedation, prisons spend very little. Prisoners sleep well. At present in England and Wales there are about 22,000 males and about 800 females in prison. Compared with the 360 mental institutions in Britain, negligible sedation is used. This is a very curious disparity. It is as curious as the fantastic male/female ratio. In Scandinavian prisons there are even fewer women. Crime is essentially a male problem, and the male prisoner sleeps well. Incidentally, the male/female ratio does not crop up in psychiatry, because in the major and minor disorders the sex incidence is about equal. This poses a nice problem to the psychopathologist, who attempts to use the same scheme of psychological causation for both psychiatry and criminology. The male-dominated problems of crime cannot be telescoped into the same schemes of causation as the psychoses, psychoneuroses and psychopathies. While the female is being treated for insomnia, the Western male is sleeping soundly in jail.

Many adolescents sleep deeply and well. Some true psychopaths have an abnormal depth of sleep, and thus they bed-wet. Many chronic schizophrenics sleep well without hypnotics despite the fact that towards evening

their aural hallucinations become worse. If the schizophrenias did represent intolerable mental conflict, one would expect catastrophic manifestations in the half-waking and half-sleeping state. This is not so. Some schizophrenics do require sedation, but a surprising number sleep well without it.

The situational aspects of insomnia have been known throughout the ages. Some contemporary psychotherapists, with sardonic prurience, discount the value of "the long sea voyage", but surroundings have an accepted effect upon sleep. The absence of familiar sounds can be as disturbing as the presence of unfamiliar ones. The specially trained commandos could sleep in conditions of extraordinary discomfort. It had to be learned. Once learned it had later to be unlearned so that the post-war wife was confronted with an ex-service husband who could sleep only on a hard floor. Such cases were not uncommon. The question then arises as to whether soft comfort in the design of bedding is desirable. To what extent is insomnia a "class" symptom?

Many tense and morbidly anxious people can relax only on a hard surface. It seems that the unyielding surface induces reflexly a sense of security, which produces muscular relaxation. Hence what is consciously pleasurable to the body might not be the ideal surface when consciousness is surrendered. The fact remains that the commercial exploitation of bedding in modern times has been accompanied by a prodigious increase in the consumption of hypnotic drugs.

The prescribing of hypnotics is difficult to avoid because of current social pressures. It is rare for the prescriber to consider dosage in terms of the patient's weight. The same dose ought not to be given to an eight-stone woman and to a fourteen-stone man. Some of the principles outlined above can be retained in the form of a compromise. A most satisfactory plan from the outset is to insist that the prescribed drug be taken on alternate nights only. If possible the administration should be entrusted to a responsible member of the family, so that self-administration is avoided. The insistence upon alternate nights lessens the risk of dependency and addiction; and a considerable number of patients begin to sleep well on the nights when the drug is not given. A great deal is made of the type of hypnotic needed. There are now such a wide range available and such vocal advocates of particular preparations that the factor of belief must play a large part in the end result. A great responsibility rests on the practitioner who initiates young people into the taking of hypnotics. The gelatine capsule has paved the way to smooth prescribing, but it also figures in suicides. Denmark has the highest suicide rate in the world, and a special resuscitation unit which goes into action with much speed. In the older group of patients, the warning about combining barbiturates with alcohol should always be given. Unfortunately, few practitioners go any further in this problem beyond repeating the dose at the patient's request; and the worst offenders are the out-patient clinicians.

It is important to record the effects of the hypnotic and to begin the weaning process early. The progressive reduction of the dose should be accompanied by an insistence that the patient retire at a progressively later time. The retiring time is of prime importance, because the psychoneurotic depressive patient craves sedation in the early evening and stimulation in the morning. They say quite commonly that they want to go to sleep and never wake up. They equate sleep with death, although conscious suicidal thoughts are uncommon. A common notion about fatigue is that it is relieved by sleep. This is not true of many varieties of fatigue. Such states are often analogous to the Pavlov concept of inhibition; and what is needed is not retirement to bed, but activities which are the complete reverse of those which engendered the fatigue. Thus the stress of medical practice, or of legal practice, or of any calling where the highest discriminatory cerebral functions are involved, ought not to be treated by "rest". This is a lay concept, which has no basis in fact.

Disinhibition or release from this variety of fatigue can be accomplished only by diametrically opposed activities. In truth a change of work is as good as a rest. During the last war, the writer was privileged to see the late Sir Hugh Cairns, a pioneer in neurosurgery, sawing wood. He achieved relaxation, often with a houseman partner, by hewing logs of wood with a cross-cut saw. The most prominent cardiologist in America spurns the motor-car and, laden with bags, outwalks the strollers in busiest New York.

It is exceedingly difficult to convince the fatigued patient that activity and not sleep is needed. In our moronic culture of never-ceasing aspirations for consumer goods, the motor-car had pride of place. Detroit psychologists say that it is losing its place as a personal symbol. One in four families in Britain has a motor-car. Not to possess a car invites all kinds of inquiries. Middle-class housewives seldom go anywhere without a car, despite insomnia, increasing weight and decreasing exercise tolerance. Social taboos intervene. The average suburban housewife who goes walking has not only to explain to her family where she is going and why, but also to every neighbour she meets. Few will undertake this. A night walk raises formidable objections; two gelatine capsules raise none. Physical exercise is an essential feature of the treatment of insomnia. It is not a question so much of the dissipation of physical energy, but more the problem of disinhibition and release from tension. If the exercise, particularly in the male, releases aggression, so much the better.

The psychological aspects of insomnia need not be called the "psychodynamic" aspects. All life is dynamic in both its interior and its external aspects. The ludicrous tautology of modern literature, and in particular that of America, is exemplified in such phrases. Medical literature abounds in "true facts", "definite indications", and "real entities". Mental conflict is the commonest cause of insomnia, but it is well to remember an observation of Nehru. He said that only a lunatic is free of conflict. Hence the psychotherapist who tackles the problem of insomnia in a patient should not attempt to re-create him, but should attempt to give him sleep. Furthermore, psychotherapy divorced from situational measures is rarely successful; and until the total problem of the patient is recorded "meaningful interpretations" ought to stay within the therapist.

An interesting psychopathological aspect of sleep occurs after a murder or the infliction of grievous bodily harm, particularly when premeditated and motivated by a notion of retribution. The perpetrator often sleeps soundly for the first night. Many ordinary people would sleep soundly if they could act out their conflicts to some extent. It is not merely coincidence that the rise of vicarious entertainment and of spectator sports has paralleled the rising consumption of hypnotics.

In modern times extraordinary attention has been paid to the ramification of the sexual instinct, whereas most grave current problems arise from repressed aggression. Adlerian concepts ought to have received more attention, particularly in social psychology, than Freudian concepts. But their exposition from the witness box is practically unknown. It is indecent to be overtly aggressive, but somehow decently progressive to be vocal sexually. Most of the gloom which descends on many households in the weekend stems from the removal of the week-day outlet for aggression. Repressed aggression is the common basis for insomnia. It is rare to find insomnia in an athlete or in an individual with a constructive outlet for aggressive impulses.

Freud should never have parted company with Adler. Aldous Huxley referred to them both as being half right. To the genius of Freud are owed the clarification and definition of basic mental activities and the elucidation of much of the psychopathology of everyday life. He presented mental conflict as a tripartite affair, whereas in the past it had often been presented as a struggle between man's nobler self and baser self. Education based on this older concept has done grave harm, because neither man's nobler nor baser self leads him to self-destruction with the vigour and speed of the third

sector of the mind, the super-ego. This was Freud's name for conscience. But the latter is a hopelessly inadequate term as it refers only to the self-critical aspect of the mind, occurring at the conscious level. Before Freud, it was not realized that conscience had deep and formidable roots in the unconscious. Even when a man appears to have no conscience left, his self-degradation or self-destruction is produced by the unconscious activity of the super-ego. The roots are unconscious and unremembered simply because they are formed in the early years of life. In these formative years, the savagery done by parents, educators and religious fanatics to this third and tender structure of the mind bames description. Life experiences often demolish much of conscience in late adolescence, but the strength of the earlier-formed roots persists. In the study of criminals this is a common finding. The recidivist leads a life in which crime and punishment follow one another like the ticking of a clock. No amount of top dressing of the nobler self or of chastisement of the baser self makes the slightest difference. But in the rare phenomenon of conversion, this unconscious self-punishing root of the super-ego swings into full consciousness. There is no one as harsh as a reformed rake.

In the jargon of psychopathology, super-ego trouble is a common cause of insomnia. The just are supposed to sleep deeply. From the super-ego stems diffuse guilt, often irrational, and from guilt comes anxiety and tension. Prison abolishes guilt as do active service or any physical hazards; but life in hospital and nursing care increase guilt. The more attention the patient with insomnia gets the less he sleeps.

"The Vicar of Wakefield" was written long before Freud's time. The Vicar's hounding self-destructive super-ego brought misfortunes to himself and to his family. Safely in jail he slept soundly. The next morning he woke up in prison and found his family gathered about his straw bed. He observed: "I gently rebuked their sorrow, assuring them I had never slept with greater tranquillity."

The situational aspects of sleep and of insomnia are often interwoven with the internal mental conflicts of the individual. Sir Mortimer Wheeler, the great contemporary archeologist in Britain, was also a fine soldier. At El Alamein he wrote: "About 3 o'clock in the morning I lay down in my coat amongst the din and went easily to sleep." But it is of interest that his personal philosophy is expressed thus: "War is a natural condition of man. Whether war be good or bad is not in question; nor is the canon of rectitude whereby such niceties may be judged. But, for good or ill, to regard war as a temporary lapse from a normal condition of peace, is to invert nature and falsify history." Wheeler knows the history of mankind from the dawn of history, not only from books, but also from an unsurpassed acquaintance with the relics of ancient civilizations. It is better for mankind to acknowledge and channel the aggressive instinct than to pretend that it does not exist.

For the male, current forms of occupational therapy are fatuous. Weaving, woodwork, painting, printing and pottery are suitable for female patients under female direction. But even then, these outlets take no cognizance of the role of repressed aggression in the female. An infantile memory of Adler's was of the woman who was kind to a bird, but threw flower pots at her husband. Adler's writings have more to offer the occupational therapists than the hotch-potch of Freud which they nearly always get. In the sleepless female, repressed aggression is more difficult to release. It often stems from the rejection of her femininity, and from a homosexual attachment to her own sex in earlier life, which is then brought into sharp focus by the responsibilities of marriage. The passive and dependent role in marriage is abhorrent to her. The whole household revolves about her insomnia. The complexity of such a situation brings home to the practitioner that there is no such thing as simple psychiatry, only simple psychiatrists.

The treatment and management of insomnia proceed from the factual and the simple procedures to the more

complex procedures in orderly style. Referral of the patient to a psychiatrist is a step which should be weighed carefully. It should be taken only if the practitioner discerns positive indications of the need of psychiatric treatment. The initial and prompt management of insomnia, in the situation which gave rise to it, takes precedence over all other measures.

References.

- GOLDAMITH, O. (1909), "The Vicar of Wakefield", Oxford Edn., Henry Frowde.
WHIMLER, M., "Still Digging", Michael Joseph (reproduced by Odhams Press Ltd., Long Acre, London).

Reviews.

An Introduction to Surgery. Edited by David H. Patey, M.S., F.R.C.S.; 1958. London: Lloyd-Luke (Medical Books). Limited. 7½" x 4½", pp. 238, with 54 illustrations. Price: 17s. 6d. (English).

AS PART of the current revision to medical curricula, "Introductory Courses" are being used in an attempt to make the transition from the basic medical sciences to the clinical years an easier one. To facilitate this, the surgical staff of the Middlesex Hospital under the direction of Mr. D. H. Patey, the Director of Surgical Studies in the hospital, have collected their contributions to this introductory course in a small volume entitled "An Introduction to Surgery". As with all simplifications of a vast and complicated subject, many criticisms can be directed against it. Those features which one person will regard as important, another may not, and all sorts of variations are possible. In this volume are collected those features which this particular staff regards as being significant in the introduction of the student to clinical surgery. The information given in it is, therefore, briefly stated and at a fairly superficial level. However, in the particular surroundings that obtain at the Middlesex Hospital this must obviously have a useful purpose, and there would be very few schools in which the book would not find a valuable place in the students' early studies. The provision of two different bindings seems to be an excellent one. As well as the ordinary cardboard-covered volume, there is a "paper back" student's edition, which the authors hope will be "a partial answer to the problem of rising costs which threaten to destroy the idea of personally owned textbooks". This must surely be a principle which can be widely used, and which will relieve the ever-increasing burden on the pockets of both students and their parents.

The Clinical Examination of the Nervous System. By G. H. Monrad-Krohn, M.D., F.R.C.P.; Eleventh Edition; 1958. London: H. K. Lewis and Company, Limited. 8½" x 5", pp. 486, with 173 illustrations. Price £2 (English).

In the preparation of the eleventh edition of this book, Professor Monrad-Krohn has been assisted by Professor S. Refsum, his successor to the Chair of Neurology, University of Oslo. Emphasis throughout is on clinical examination in this work written "from the clinic and for the clinic". Nevertheless, the number and variety of ancillary techniques, including pharmacological diagnostic tests such as the "Neostigmin" and "Tensilon" tests, may well bewilder the beginner. Professor Monrad-Krohn indeed sees a great future for biochemistry in the investigation of cerebral functioning. The sections on electroencephalography, aerography and angiography have been brought up to date. This edition includes the complete scheme of examination of aphasia and allied disturbances which Professor Monrad-Krohn published in 1917, four years before the appearance of the first edition of the present work. The chapter on associated or synkinetic movements has been expanded, and the appendix includes diagrams of the blood supply to the cerebral hemispheres, a brief scheme of neurological examination of a patient on admission to hospital, and a section on the examination of an unconscious person. The authors call attention to inconsistent features in pyramidal affections, and conclude that the pyramidal tract, in which ascending fibres have been described, includes structures subserving a variety of functions. Pyramidal lesions are not invariably manifested by increase in the deep reflexes. Since disturbances of the vegetative system receive adequate notice, more attention might have been given to endocrine functions. The authors warn against overlooking the individual in the applications of diagnostic techniques. The scheme of examination of mental functions might profitably

be expanded to include more reference to personality and temperament. This edition of the work will enhance its reputation as a neurological classic.

Progress in Cardiovascular Diseases. Edited by Charles K. Friedberg, M.D. Volume I, Number 1, "Progress in Cardiac Surgery", 1958. New York: Grune and Stratton, Incorporated. 10" x 6", pp. 122, with many illustrations. Price not stated.

In the editorial introduction to the first issue of this new journal, it is stated that it is designed to appeal to the general physician as well as to the cardio-vascular specialist.

The list of contributors to the first issue is certainly an imposing one, and includes the names of many leading authorities on cardiac surgery, to which this particular number is entirely devoted. However, one must necessarily be critical of a new production such as this. Does it genuinely fill a need? The cardiovascular specialist will find little to interest him in this issue, consisting as it does largely of a series of general review articles, all of which have been more than adequately covered recently in other specialist heart journals.

A production such as this may well have a greater appeal to the busy general physician who desires to be *au fait* with recent developments in this rapidly advancing field, and would appreciate their presentation in a readily assimilable manner. The sponsors of this publication would do well to concentrate on a series of short articles on specific subjects of current interest; this would be preferable to the very general series of papers presented here, several of which are largely repetitive.

A more selective and comprehensive presentation of the material available by authors of the calibre of those who have contributed to this number, together with a careful consideration of the most suitable symposia of general interest for presentation in subsequent issues, could materially enhance the value of this publication.

Ciba Foundation Colloquia on Ageing: Water and Electrolyte Metabolism in Relation to Age and Sex. Edited by G. E. W. Wolstenholme, O.B.E., M.A., M.B., B.Ch., and Maevae O'Connor, B.A.: 1958. London: J. and A. Churchill, Limited. 8" x 5", pp. 340, with 85 illustrations. Price: 45s. (English).

THE fourth volume of the Ciba Foundation Colloquia on Ageing deals with water and electrolyte metabolism in relation to age and sex. A group of workers in one or other aspect of physiology and experimental medicine—27 in all from various parts of Europe and America—met in London. Papers given by various members of the panel were read and then discussed by the whole panel. As is always the case with the Ciba Colloquia, the speakers were all of the highest standing, the papers given very informative and the discussions very illuminating. Eighteen papers were read, and there were opening and closing remarks by the chairman. In addition there were two general discussions not particularly related to any of the papers. The field covered was wide—various aspects of the regulation of water and electrolyte concentrations in the cells, the relation of hormones to this regulation, the effect of food intake and water intake on bodily composition and the effect of increasing age on regulation and excretion. Acid-base control was also considered, as well as the effect of age on the kidneys. The ground is thoroughly covered and anyone interested in electrolyte and water metabolism must find much of interest and much new and valuable material in this book. It can be highly recommended particularly for advanced study.

Nutrition and the Papuan Child. By H. A. P. C. Oomen, D.Sc., M.B., and S. H. Malcolm: 1958. South Pacific Commission Technical Paper No. 118. Noumea, New Caledonia: South Pacific Commission. 10" x 8", pp. 153, with 75 illustrations. Price: 8s. sterling.

THE latest South Pacific Commission Technical Paper deals with a study of the nutrition of the Papuan child by H. A. P. C. Oomen, a medical nutritionist, and S. H. Malcolm, a dietitian-nutritionist. Seven different areas, in different kinds of countries and differing in relation to sea and mountains, were studied in particular concerning the food habits, customs and taboos of women and children. The areas were close to the sea or in nearby mountains in Dutch New Guinea and Australian New Guinea. As a considerable amount of information was gathered about each neighbourhood, and as the areas differ so much between themselves, a detailed review is not possible.

The information about the food supplies and food habits was collected in periods of about four to five weeks, so it cannot be entirely accurate, but is probably sufficiently so to give a general picture. In some of the places sago is eaten in much greater amount than any other item of food, and this is far from being a complete food. Protein seems to have been in very short supply in several of the places visited. Babies are probably saved by the fact that breast feeding goes on for two to two and a half years.

Children do not show much divergence from white averages during the first six months of life. After this they remain consistently below the weight of white children. It seems highly probable that many of the children—and adults—live and grow on diets which would be considered grossly inadequate in Europe or the United States. The survey can be taken as only a preliminary one, but there is enough information in the publication to show that there are many very interesting topics to be studied in detail in New Guinea. The report is one to be studied by anyone interested in the relation of growth to food intake of children.

Psychosomatic Ophthalmology. By T. F. Schlaegel, Jr., M.D., with the collaboration of Millard Hoyt, M.D.: 1957. Baltimore: The Williams and Wilkins Company. Sydney: Angus and Robertson, Limited. 9" x 6", pp. 536. Price: £6 1s.

THIS is a valuable and worthwhile book worthy of the attention of all psychiatrists and ophthalmologists. It is a mine of fascinating and recondite information and anecdotes. The author is described as a "practising" ophthalmologist and a "qualified psychiatrist". It seems that the author is still very much in the honeymoon phase of psychiatry and his great enthusiasm, though very pleasant, has led him into rather overstating his case. His enthusiasm seems also to have led him to try to include rather too much in somewhat too small a compass, and gives some of the material the appearance of being undigested and rather dogmatic. He has also been led by his enthusiasm to some degree of psychiatric naivety. These factors, coupled with the strongly psychoanalytical orientation of the book, may lead the ophthalmologist to regard it as possibly being somewhat unbalanced. The psychiatrist, on the other hand, may well feel that it could be read with an open mind by a psychiatrist, but that an ophthalmologist should be somewhat more cautious. The book contains an impressive and very useful list of references. It also presents an excellent summary of specific reading disability worthy of the attention of all psychiatrists, ophthalmologists and paediatricians.

There are several rather confusing misprints and one or two errors, of which perhaps the worst is to refer to Azacyclonol as "Meretran".

The book is well written and clearly and simply expressed, and can be read with speed and enjoyment.

Theory of Psychoanalytic Technique. By Karl Menninger, M.D., Menninger Clinic Monograph Series, No. 12: 1958. London: Imago Publishing Company, Limited. 9½" x 5½", pp. 224. Price: 25s. (English).

THIS book illumines the nature of the doctor-patient relationship in general practice and in every speciality, while revealing the essentials of psychoanalytical treatment in an unusually interesting way. It also demonstrates the practical interest in humanity that led to the establishment of the Menninger Foundation.

Freud and the 20th Century. Edited and selected by Benjamin Nelson: 1958. London: George Allen and Unwin, Limited. 8½" x 5½", pp. 320, with illustrations. Price: 28s. (English).

THIS book contains 16 essays on the impact of Freudism upon philosophy, general psychology, art, literature, politics and religion, edited and selected by Benjamin Nelson. One of the contributors, Victor von Wierzecker, described as a German pioneer in psychosomatic medicine, refers to 1900, the year in which Freud published "The Interpretation of Dreams", as the dawn of a new era in the history of science and cultural sensibility. Nigel Walker, however, discounts the claim that Freud effected a revolution in thought as radical as the theories of Copernicus and Darwin. Freud's "Civilisation and its Discontents" (1930) is regarded by Professor Nelson as "the most distinctive statement in the philosophy of existence and civilisation which has been produced in the present century". Reinhold Niebuhr, on the other hand, argues that the Christian doctrine of original sin offers a broader view of human nature and behaviour.

G. Zilboorg, one of five psychiatrists in the 16 contributors to the volume, bemoans the decline of humanism and the service of society to the individual in favour of emphasis on the adaptation of the individual to society. Professor Kaplan sees little connection between Freudian theory and modern philosophy while allowing that theories of knowledge may be modified through recognition of subconscious influences on reason. Professor Gombrich, in "Psycho-analysis and the History of Art", maintains that the real work of art achieves more than "the satisfaction of a few analysable cravings". Any private meaning for the artist is "all but swallowed up" in the reverberation of society to his work.

Those who can find the time will find ample substance for intellectual stimulation in this volume.

Comparative Aspects of Hemolytic Disease of the Newborn. By G. Fulton Roberts, M.A., M.D.; 1957. London: William Heinemann (Medical Books), Limited. 7½" x 4½", pp. 200. Price: 17s. 6d. (English).

This book is a scholarly appreciation of a disease which has attracted attention throughout the world since the pathogenesis was established after the discovery of the Rh factor. The author has for the first time provided an historical account extending back to the seventeenth century, and has discussed the disease as it occurs in animals as well as in humans. The bibliography is undoubtedly the most complete so far prepared on the historical and comparative aspects of the disease, and it will assist all future writers. Aetiology, pathogenesis, clinical features and treatment are all logically and helpfully discussed.

We generally appreciate the use of illustrations to clarify and expand textual discussions in scientific literature, and were at first somewhat disappointed that Fulton Roberts, in following a whim, had written this small book in continuous prose without illustrations. However, the attractive style and clarity of expression fully compensate for the absence of conventional visual aids. The book should be read not only by those interested in any of the many facets of hemolytic disease of the new-born, but also by anyone who appreciates quality of style in scientific literature.

Sensitivity Reactions to Drugs. A symposium organized by the Council for International Organizations of Medical Sciences, established under the joint auspices of UNESCO and WHO, edited by M. L. Rosenheim and R. Moulton, assisted by S. Moeschlin and W. St. C. Symmers; 1958. Oxford: Blackwell Scientific Publications. 8½" x 5½", pp. 248, with many illustrations. Price: 35s.

This book is a report of a symposium held under the sponsorship of the Council for International Organizations of Medical Sciences in Liège in 1957. At the outset it must be said that this is an excellent and timely contribution on a subject which is becoming, unfortunately, a prominent feature associated with modern therapeutics.

There are some nineteen contributions, all by experts from a variety of medical sciences. In an introduction by Professor M. L. Rosenheim, who was chairman of the symposium, the general problem of drug sensitization is discussed, and the nomenclature which describes the untoward effects of drugs is examined and defined. The symposium dealt principally with one aspect, that of hypersensitivity-allergic reactions.

In subsequent chapters there are accounts of all aspects of the subject. The hemolytic reactions to drugs are reviewed, the occurrence of megaloblastic anaemia with anticonvulsants, thrombocytopenic purpura due to drugs, drug-induced agranulocytosis and bone-marrow aplasia with chloramphenicol and other drugs are discussed in detail in the first half of the book, and the less directly clinical aspects of the subject comprise the remainder. The immunological nature of humoral antibodies in drug allergy is considered by several contributors, and this section is followed by an account of the relationship between the chemical structure of drugs and their liability to cause sensitization. Drug-induced histamine release, tissue reactions to drugs and the collagen diseases as a manifestation of drug sensitivity also provide material for three very interesting contributions in the latter part of the book.

There have been a number of books recently on this subject, but before this one was published they were almost entirely devoted to recording and cataloguing the effects which had been observed clinically. Here, on the contrary,

is a collected series of papers by experts in which clinical material is considered and correlated with laboratory experiments, and the whole is leavened with a very good discussion between participants at the symposium at the conclusion of the chapters. We are very critical of reports of discussions of this kind, as they seem so often to be unedited stenographic records which could hardly be considered fit for publication as they stand. This is not so in the present case, in which the discussions add very materially to the chapter material and often answer the very questions the reader is itching to ask. Needless to say, adequate references are appended and the book is a credit to the publishers. It should be read by all clinicians for its real practical value as well as for its absorbing scientific considerations.

Psychopharmacology: Pharmacologic Effects on Behavior. Edited by Harry H. Pines, M.D., D.Med.Sci. (Neurology); 1958. New York: Hoeber-Harper Book. 9" x 6" pp. 276, with illustrations. Price: \$8.00.

This is the third volume in the "Progress of Neurobiology" series, and it is a timely account of drugs which affect behaviour. The editor states in his introduction that "this symposium presents the valiant efforts of the various frames of reference to 'explain' the mental effects of drugs"—which puts the situation in a nutshell. So much of present-day research in pharmacology, and in psychopharmacology even more so, is exploratory and tentative; but we depend on reviews such as the present one to pose the questions to be answered and point the way for further work.

There are 44 contributors to the present volume, all working in America or Canada, and these participants present 13 chapters dealing with various aspects of the subject. Each chapter concludes with a very good bibliography, which is vital in a work of this kind, and there are also some useful discussion reports on some of the material in the chapters.

Particularly interesting are the chapters dealing with the biochemistry of tranquillizing drugs, the assessment of central stimulant and tranquillizing effects, the biochemistry of the hallucinogens, and several others which deal with laboratory methods for use in the search for new drugs of potential value in psychiatry.

A tremendous amount of data is presented in this book; but by the very nature of the problems examined very few conclusions can be drawn. In fact, we are still in the stage of collection and correlation of data, which precedes the development of theories based on firm foundations.

This book is not one for the clinician, unless he is also spending much of his time in the research laboratory; but it is an excellent objective account of present-day knowledge in psychopharmacology, which will prove invaluable to the research worker and medical scientist.

Coffee and Caffeine. By Rolf Ulrich, translated by Janet Ellingham; 1958. Bristol: John Wright and Sons, Limited. 8½" x 5½", pp. 52. Price: 7s. 6d. (English).

This is a rather odd little book. It is a translation from a monograph in German, and deals with many aspects of the pharmacology of caffeine. In a foreword it is pointed out that "from the point of view of the guidance of public health the work is in agreement with the intentions and instructions of the Landesgesundheitsverwaltung der freien Hansestadt Bremen Institute of which the author is a fellow worker", and this certainly seems to have induced some bias in the author.

The book starts with a brief historical survey of caffeine and coffee-drinking in Europe; but the author appears to have overlooked the fact that tea has just about the same caffeine content per cup as coffee. He then proceeds to describe the effects of caffeine on the circulation, the nervous system, as a diuretic, on the gastro-intestinal tract and on the skeletal musculature. This account is by no means objective. Instead of stating, for example, that caffeine has a marked action on the nervous system, the translation reads: "The most dangerous attacking point of caffeine in the human body is the nervous system."

As the book progresses, the evil features of coffee and caffeine become more obvious, and coffee is classed as a "toxic luxury" with nicotine and alcohol, whereupon the author digresses to give some rules for smoking by athletes. The drinking of coffee by athletes is likened to the doping of horses, and yet in the sportsman addicted to coffee it becomes a necessity to achieve his best performance.

Later sections of the book consider caffeine in relation to sexual reproduction, and some experiments are described which support the conclusion that "caffeine is a poison with a predilection for the gonads of black rabbits". In relation to motor-driving and alcohol-drinking, too, caffeine is stated to be harmful for several reasons, one of which is that it has a sobering influence, but that since this takes about 15 minutes to be effective, an accident could have occurred in the meantime.

The book has a few references, but they appear to be restricted to German publications; yet some very significant studies of caffeine upon fatigue and work performance have appeared in American and British journals.

It seems to us that the fact that "a substance is essentially foreign to the organism and not absolutely necessary for nourishment" does not automatically make it a toxic luxury. Coffee and caffeine can be abused, it is true, and a sleepless night will follow a heavy coffee session in the evening; but as the author states, "compared with the evils alcohol and nicotine caffeine is only a small devil"—probably a very much smaller one than this book indicates.

Books Received.

[The mention of a book in this column does not imply that no review will appear in a subsequent issue.]

"Clinical Orthopaedics", Anthony F. DePalma, Editor-in-Chief, with the assistance of the Associate Editors, The Board of Advisory Editors and The Board of Corresponding Editors. Number Twelve; Fall, 1958. Philadelphia and Montreal: J. B. Lippincott Company, and Sydney: Angus & Robertson, Limited. 10" x 7", pp. 340, with many illustrations. Price: 82s. 6d.

A periodical volume "designed for the publication of original articles offering significant contributions to the advancement of medical knowledge".

"Psychiatry in General Practice", by J. A. Weljel, M.D.; 1958. Amsterdam, London, New York and Princeton: Elsevier Publishing Company. London: D. Van Nostrand Company Limited. 9" x 5½", pp. 216. Price: 37s. 6d (English).

The author's purpose is "to make psychiatry available for general practice".

"Lectures on Epilepsy", edited by A. M. Lorentz de Haas; 1958. Amsterdam, London, New York and Princeton: Elsevier Publishing Company. London: D. Van Nostrand Company, Limited. 8½" x 5½", pp. 180, with 26 tables. Price: 24s. (English).

Four lectures delivered at the Epilepsy Centre "Meer en Bosch" at Heemstede, The Netherlands.

"Leprosy in Theory and Practice", edited by R. G. Cochrane, M.D., Ch.B. (Glas.), F.R.C.P. (Lond.), D.T.M. and H.; with a foreword by Sir George McRobert, C.I.E., M.D. (Aberd.), F.R.C.P. (Lond.); 1959. Bristol: John Wright & Sons Limited. 9½" x 6½", pp. 424, with 189 illustrations. Price: 84s. (English).

An attempt to provide a comprehensive account of leprosy in its modern setting.

"Heredity Counseling", edited by Helen G. Hammons; 1959. New York: A Hoeber-Harper Book 3" x 5½", pp. 128; Price: \$4.00.

A symposium dealing with the major problems of heredity in medicine and with counselling for those who seek genetic advice in marriage and reproduction.

"The Leech", published by the Medical Graduates Association and the Students Medical Council of the University of the Witwatersrand, Johannesburg. Volume 28, Numbers 3, 4, and 5; November, 1958. 9½" x 7½", pp. 155. Price: not stated.

A special number in honour of Professor Raymond Arthur Dart on his retirement from the Chair of Anatomy of the University of the Witwatersrand.

"Official Year Book of Western Australia; 1957", Issued under the authority of The Honourable Gilbert Fraser, M.L.C., Chief Secretary, by R. J. Little; 1958. Perth: Alex B. Davies, Government Printer. 9½" x 5½", pp. 382, with illustrations. Price: 10s.

The first volume in a new comprehensive series.

"Orthopaedic Nursing", by Mary Powell, S.R.N., M.C.S.P., with a foreword by Sir Reginald Watson-Jones, B.Sc., F.A.C.S. (Hon.), M.Ch.Orth., F.R.C.S., F.R.C.S.Ed. (Hon.), F.R.A.C.S. (Hon.). Third Edition; 1959. Edinburgh and London: E. & S. Livingstone Limited. 8½" x 5½", pp. 476, with 279 illustrations. Price: 27s. 6d. (English).

The author is Matron of the Nuffield Orthopaedic Centre (Wingfield Morris Orthopaedic Hospital), Oxford.

"Treatment in Internal Medicine", by Harold Thomas Hyman, M.D.; with a foreword by Walter C. Alvarez, M.D.; 1958. Philadelphia and Montreal: J. B. Lippincott Company. Sydney: Angus & Robertson, Limited. 10" x 7", pp. 624, with 42 illustrations. Price: £6 17s. 6d.

The author designed this to be "a functional text, planned and integrated to serve as a single volume 'office and bedside consultant' to colleagues who deal first hand with the problems of daily practice".

"The Functions of the Endocrine Glands", by Peter F. Hall, M.D., M.R.C.P., M.R.A.C.P.; 1959. Sydney: Horwitz Publications Inc. London: Pitman Medical Publishing Company, Limited. Philadelphia: W. B. Saunders Company. 8½" x 5", pp. 308, with 77 illustrations and 2 tables. Price: 70s.

The author is an assistant lecturer in physiology in the University of Sydney.

"Histochemical Technique", by W. G. Bruce Casselman; 1959. London: Methuen & Company, Limited and New York: John Wiley & Sons, Limited. 7½" x 4½", pp. 208, with illustrations. Price: 18s. (Abroad).

The author states that "this monograph attempts to provide an introduction to the principles and practice of microscopical histochemistry, especially the chemical aspects, and to present a beginning selection of reliable techniques applicable to a variety of biological problems".

"Diseases of Livestock", by T. G. Hungerford, B.V.Sc., H.D.A.; Fourth edition; 1959. Sydney, Melbourne, Wellington and London: Angus & Robertson, Limited. 9½" x 5½", pp. 624, with many illustrations. Price: 50s.

Compiled originally as lectures and demonstrations to students at the Hawkesbury Agricultural College, N.S.W., it is mostly in non-technical language for farmers, graziers, agricultural students and other non-veterinarians.

"A Manual of Anaesthetic Techniques", by William J. Pryor, M.B., Ch.B. (N.Z.), F.F.A.R.C.S. (Eng.), D.A. (Eng.), F.F.A.R.A.C.S., with a foreword by the late J. H. T. Chaila, M.R.C.S. (Eng.), L.R.C.P. (Lond.), F.F.A.R.C.S. (Eng.), D.A. (Eng.); Second edition; 1959. Bristol: John Wright & Sons Limited. 8½" x 5½", pp. 240, with 75 illustrations. Price: 27s. 6d. (English).

Designed to be "an anaesthetist's vade-mecum, where he can look up any practical problems which confront him during the day-to-day administration of anaesthetics".

"British Medical Association Year Book 1958-1959"; 1958. London: British Medical Association. 7½" x 4½", pp. 244.

"Modern Treatment Yearbook, 1959: A Yearbook of Diagnosis and Treatment for the General Practitioner", edited by Sir Cecil Wakeley, Bt., K.B.E., C.B., LL.D., M.Ch., D.S.C., F.R.C.S., F.R.S.E., F.R.S.A., F.A.C.S., F.R.A.C.S.; Twenty-fifth edition, 1959. London: Baillière, Tindall and Cox, Limited. 8½" x 5½", pp. 330, with illustrations. Price: 30s. (English).

The Silver Jubilee volume of this Yearbook.

"Studies on Fertility: Including Papers Read at the Conference of the Society for the Study of Fertility, London, 1958, being Volume X of the Proceedings of the Society", edited by R. G. Harrison, M.A., D.M.; 1958. Oxford: Blackwell Scientific Publications. 8½" x 5½", pp. 188, with 4 tables. Price: 25s. (English).

A notable feature is the publication of a group of papers on the biological and clinical effects of progestogens, with particular relation to their use in fertility control.

"American Drug Index, 1959", by Charles O. Wilson, Ph.D., and Tony Everett Jones, Ph.D.; 1959. Philadelphia and Montreal: J. B. Lippincott Company. Sydney: Angus & Robertson Limited. 8" x 5½", pp. 678. Price: 63s. 3d.

Prepared for the identification and correlation of the many pharmaceuticals available to the medical and allied professions.

The Medical Journal of Australia

SATURDAY, MAY 2, 1959.

A SURGEON LOOKS AT SHARKS.

IN 1933 we published an article entitled "Shark Attacks in Australian Waters" by a Sydney surgeon, Victor Coppleson.¹ In it he set out in some detail information that he had gathered about attacks made by sharks in various parts around the coastline of Australia, discussed the characteristics and habits of man-eating sharks and the circumstances of the attacks that had been recorded, and finished by describing the types of wounds caused and giving some notes on their treatment. Nothing of its kind appeared to have been published before, and it aroused world-wide interest. It was translated and reprinted in many foreign journals, and Dr. Coppleson received requests for information and for reprints from many countries. People throughout the world were evidently interested in sharks and their ways, and Dr. Coppleson was encouraged to extend his investigations. The results of these investigations have now been published in a book.² From the foreword we learn that the original stimulus for the inquiry was a request received from the Surf Life Saving Association for an article on "Shark Bite" for the Association's handbook. A search of the medical literature revealed little beyond odd reports of individual attacks, so Dr. Coppleson decided to collect the accounts of shark attacks and incidents after 1919 which could be traced from newspapers and other sources, and to bring them together to see what they would reveal. (The year 1919 was chosen because in that year surfing first really became a popular sport in Australia.) The article of 1933 was the result of this initial work, but it proved to be the beginning of a life-long study of sharks and shark attacks, as well as of a book on this grim but fascinating subject which compasses the seven seas. "The trail of death, injury and destruction has been followed assiduously throughout the world", Dr. Coppleson tells us, and no sphere of shark activity has been overlooked. "The dangers that confront fishermen, the risks of men adrift in the open sea in boats, rafts and lifebelts, and the undersea perils of divers, spearfishermen and frogmen have all been studied and recorded."

The book is in four parts. Part I deals with the shark in action. It tells us what little is known of sharks and their individual habits from the observations of scientists

and other careful observers, as well as a certain amount from less reliable sources, and the theory of the "rogue shark" is introduced. In Part II an exhaustive account is given of the various shark attacks that have taken place in Australian waters, and the concluding chapter analyses the times and places of the attacks, fitting them into a pattern and a timetable. The world pattern of shark attacks is considered in Part III. Part IV describes other experiences with sharks—on the part of skin divers and spear fishermen, people in boats and on rafts, and survivors from shipwrecks and the like; the last chapter deals with ways of "beating the menace". In concluding sections information is given with diagrams on how to recognize a shark, the various reputed man-killers are sketched, and a table supplies details for the identification of the various species of shark. Three appendices supply in note form details of over four hundred shark attacks recorded throughout the world. Altogether a remarkable amount of information is packed into the 270-odd pages of the book. A plain, blunt tale, with no high literary pretensions, it is probably an unparalleled record of its kind. There is a certain amount of repetition, which is irritating, but this is probably unavoidable, and the mass of fascinating material presented in the author's racy style, with occasional flashes of dry humour, holds the interest.

"Shark Attack" is not a medical text-book, and will be acceptable to a wide audience. Nevertheless, the author's profession creeps through into his writing at times, and his medical colleagues should be particularly appreciative readers. They will find a good deal of detail about types of shark wounds and the ways in which they are inflicted, including the interesting "bumping theory", which suggests that many injuries are caused, not by sharks' teeth, but by their rough, speeding bodies, their fins and their tails. Information is also given about types of sharks, their identification, their habits and their digestive function. Two points may be specially noted. One is the correlation between sea temperatures and shark attacks: it would appear that sharks attack only at sea temperatures in the vicinity of 68° to 78° F. The other is the intriguing and feasible theory of the "rogue shark", which, as Dr. Coppleson says, threads its way through the stories. He comments: "A rogue shark—if the theory is correct, and evidence appears to prove it to the hilt—like the man-eating tiger, is a killer which, having experienced the deadly sport of killing or mauling a human, goes in search of similar game. The theory is supported by the pattern and frequency of many attacks." An unexpected interlude is an excursion into forensic medicine, with an account from first-hand knowledge of the investigation of the "Shark Arm Murder" mystery. This story loses nothing in the telling but is strictly factual. Indeed, not the least acceptable of the book's qualities is the lack of sensationalism. It is objective and crammed with facts, but for all that it is far from dull. If the concentration of over four hundred shark attack stories within one short volume seems a little awesome, it is kept in perspective by the assurance that "death by shark bite, while grotesquely spectacular, is an uncommon cause of death in Australia". Back in 1933, Dr. Coppleson, in concluding his article in the *Journal*, said that it would seem obvious that the mortality of these injuries would always remain high,

¹ MED. J. AUST., 1933, 1: 449 (April 15).

² "Shark Attack", by V. M. Coppleson; 1958. Sydney: Angus and Robertson, Limited. 8½" x 5½", pp. 284, with many illustrations. Price: 32s. 6d.

"as, apart from the fact that many of the patients are moribund when they reach shore, the all-important immediate treatment upon which recovery frequently depends and which would test the skill of a highly trained casualty surgeon, almost invariably rests with someone with little or no experience". This is a situation which it is practically impossible to alter, so that the great advances that have been made in traumatic surgery since 1933 can have only a limited effect on mortality from shark attacks. The improvement in the practical situation comes largely from a different direction. The most important factor apparently has been the reduction in the number of attacks as the result of extensive and methodical meshing for sharks. The search for an effective repellent seems to have been disappointing, but something may yet come of it. Although we cannot hope that there will be no more shark attacks, and we must accept the probability of a high case fatality rate, such incidents are now rare. Australian surfers are shark-conscious and in general well educated in this regard, but reasonable caution does not and should not deprive them of enjoyment of one of Australia's most popular pastimes. We may accept gladly Dr. Coppleson's cheerful assurance that statistically speaking, as far as shark attacks are concerned, a swim on a Sydney ocean beach has been no more dangerous during the past twenty years than a splash in the bath at home.

Current Comment.

"Q" FEVER—AN EPIDEMIOLOGICAL PUZZLE.

"Q" FEVER is a rickettsial disease of special Australian interest in that it was first described by E. H. Derrick as a result of his investigation of an outbreak which occurred in a meat works in Brisbane in 1935. His account of the disease was published in this Journal in 1937,¹ together with an account of the isolation of the causative organism (later named *Coxiella burnetii*) by Sir (then Dr.) Macfarlane Burnet.² However, the disease has since been shown to be of world-wide occurrence, and it is probably impossible, at this stage, even to guess at its original focus or origin. There is good reason to regard *Coxiella burnetii* as being primarily a parasite of sheep and cattle which occasionally infects man. It is reasonable to suppose that the disease was first brought to Australia in infected sheep or cattle, and that its association, when first recognized, with a miscellaneous group of obscure fevers in Queensland, which were formerly collectively known as "coastal fever", was fortuitous.

The epidemiology of the disease, reviewed by Derrick in 1953,³ has many curious features. Sporadic infections do occur, and must often pass undiagnosed, but the disease has a distinct tendency to occur in well defined and sometimes quite sudden outbreaks. These have been the subject of several interesting epidemiological detective stories, which have originated in such diverse places as the post-mortem room, a locksmith's workshop, a ship in mid-ocean and a hospital ward. However, in most instances outbreaks have occurred among men handling sheep or cattle or their products, as was the case in the outbreaks described in this issue (see page 535). The curious point about these outbreaks is not that infections occur among men who handle sheep or cattle, but that well-defined outbreaks occur in groups of men

who have, to all appearances, been occupationally exposed for many years. It seems that the disease is normally acquired from infected animals only with difficulty, but that on relatively rare occasions some special combination of circumstances results in an outbreak which may involve quite a number of people. Whether these special circumstances primarily concern the animals which are the source of the outbreak, their environment or their human contacts is not known. It has been shown that *Coxiella burnetii* can multiply freely in several species of ticks, but it is not known what role these play in the epidemiology of the disease. Ticks do not appear to be an important factor in the transfer of the infection to man, though they have been strongly suspected in a few instances; they may have a more important role in the transfer of the disease from one animal to another, or they may simply be just another means by which this versatile organism perpetuates itself. *Coxiella burnetii* can also survive for long periods apart from its hosts, so opportunities for the transfer of infection are not wanting. Man, it appears, is just a somewhat reluctant host; but the final clue to this epidemiological puzzle still eludes us.

The group of papers by Derrick and others, published in this issue, is therefore a further instalment of an intriguing epidemiological story which has been gradually unfolding since "Q" fever was first recognized in Queensland in 1935. Finally, having been in error in the matter on a previous occasion,⁴ we should perhaps add that, in this context, "Q" stands for query, not Queensland.

PALLIATION.

In our present civilization the average age of the population is rising, and so also is the incidence of cancer. With our present limitations in the treatment of malignant disease this implies an increase in the number of patients suffering from incurable malignant conditions. Those who think there is nothing more to be said on the matter we should like to refer to John Hayward's remarks on the management of the patient with an inoperable growth, in a paper on lung cancer read at the Tenth Session of the Australasian Medical Congress (B.M.A.) held at Hobart.⁵ The treatment of patients with progressive incurable disease is an important and very difficult part of the practice of medicine. In Hayward's words, "Any doctor can treat curable disease; but it takes a very good medical man indeed to treat chronic incurable disease well".

In an editorial article in the *American Journal of Roentgenology, Radium Therapy, and Nuclear Medicine*, E. R. N. Grigg⁶ discusses the same subject, starting with the complaint that academic curricula do not give enough time to formal teaching devoted to the management of incurable conditions. Since the field of medicine is so wide, it is inevitable that this is a common complaint among those who wish to draw attention to some particular section. In this case the reply might fairly be made that the management of such situations is not something which can be fully learnt in formal lectures; it is an occasion where experience is the best teacher, preferably obtained under the guidance of some wise clinician. The management of a patient with incurable malignant disease is a situation which tests a doctor's whole attitude and approach to medicine, and if it finds him deficient, the defect is not so much in any one part of his training as in his training as a whole.

Be that as it may, Grigg proceeds to propound what he terms a "tentative decalogue of palliation" in the hope that it may help in "providing a basic philosophy for the management of incurable patients afflicted with . . . malignant diseases". This contains some sound precepts, and runs as follows:

¹ MED. J. AUST., 1937, 2: 281.

² MED. J. AUST., 1937, 2: 299.

³ MED. J. AUST., 1953, 1: 245.

⁴ MED. J. AUST., 1949, 2: 762.

⁵ MED. J. AUST., 1959, 1: 12 (January 3).

⁶ Amer. J. Roentgenol., 1958, 80: 863 (November).

1. Only one physician shall be in charge of a patient. Other consultants might be called in to help in the evaluation and care of a case . . . but the over-all responsibility for the treatment of the patient's body and mind must be in the hands of one physician only.

2. The intent of palliation shall be kept in focus. Iatrogenic drug addiction should not be permitted to occur, except in the last months of life expectancy, when it may become desirable.

3. A patient shall have an adequate period of respite from treatment. It is good medical practice to intercalate between periods of active treatment, intervals of rest during which injections, medication and strict diets are discontinued. This will make for easier handling of the patient's morale.

4. The patient shall not sense deprecation of his previous treatment. It is of no help to the patient to let him know that treatment might have been easier, or more successful, had he come earlier.

5. As a rule, nothing beyond supportive therapy shall be given to a comatose patient known to have an incurable malignancy.

6. The meaning of palliation shall not be adulterated. Besides aiming to prolong life, all efforts should be made to improve the patient's comfort. As an example, if the terminal stages of carcinomatous extension in a case in which the primary tumour was located in the uterine cervix are accompanied by uremia with a clouded sensorium, ureterostomy for ureteral drainage should be weighed with regard to life expectancy in each particular case and decided upon on its own merits or demerits.

7. The patient shall be given the opportunity to make his own decisions. This is especially true when the projected extensive removal of organs will result in the artificial drainage of excreta, and in other consequences leading to invalidism. Even in less compulsory situations, the expected degree of disability and inconvenience of a palliative procedure must be sincerely explained to the patient and the final decision should be his.

8. The patient's peace of mind shall be protected. Information regarding his illness should be offered to the patient only to the extent of his understanding and receptivity. Beyond that, proper therapy should be directed to the psychosomatic aspects of advanced malignancies.

9. The patient's family life shall be protected. As long as feasible, the patient should be encouraged to live in his familiar environment, continue his occupation and keep on enjoying his hobbies. The family should be told the truth about the patient's condition, but a divulgence of all the details to the spouse is not recommendable, at least not in the majority of cases.

10. The patient's economic status shall be considered. Sincere appraisal of the situation and a frank discussion with a responsible relative (or friend of the family) will help in bringing forth the proper decisions.

Earlier in his article Grigg discusses the meaning of palliation, beginning with the derivation of the word from the Latin *palliare*, "to cover with a cloak". From this three main groups of meanings are derived, each in its own way applicable to the management of incurable disease. These are: 1. To conceal or disguise, the degree of disclosure being adjusted to the patient's personality. 2. To cover with a mantle of excuses, realizing that the patient must not lose hope. 3. To alleviate and mitigate his physical discomforts and sufferings.

ALTERATIONS IN ENZYMES OF BODY FLUIDS.

THE body fluids in health and disease contain a large number of different enzymes, and the determination of the concentrations of these is becoming of increasing importance in clinical medicine. Estimations of some of these, such as alkaline and acid phosphatase, amylase, lipase and thrombin, have been used in medical science for some years, but during the past few years a wide range of enzymes have been investigated. F. Wróblewski, who has done much work in this field himself, has reviewed the present position of knowledge of enzyme

concentrations in disease in some detail. He states that the laboratory diagnosis of pancreatic disease has depended in part on the finding of increased concentrations of serum amylase and lipase. The determination of urinary amylase and lipase has also been useful. In the study and diagnosis of liver and biliary tract disease alterations in the concentrations of a wide range of enzymes have been used. The enzymes which have been studied recently for this purpose include isocitric dehydrogenase, 6-phosphogluconic dehydrogenase, glutamic-oxaloacetic transaminase (SGOT), glutamic-pyruvic transaminase (SGPT), hexose isomerase, cholinesterase, lactic dehydrogenase (SLD), ceruloplasmin, 5-nucleotidase, malic dehydrogenase, trypsin and aminotripeptidase. Increase in serum 5-nucleotidase content has been shown to be as sensitive as an increase in alkaline phosphatase content in the detection of the presence of biliary tract obstruction but more selective. In most instances of biliary tract obstruction the serum transaminase values are raised (SGPT in greater amount than SGOT) up to 400 units; values under 45 units are normal. However, it seems that any incomplete biliary tract obstruction without raised serum bilirubin content does not show significantly increased serum transaminase values. Serum transaminase activities are increased by intrahepatic metastatic carcinoma, SGOT values being usually raised more than SGPT values. Laennec's cirrhosis produces similar results. Various types of hepatitis, during the initial and increasing icteric phase of the disease, are associated with very high serum transaminase values up to 3600 units. In acute hepatitis without jaundice the enzyme concentrations are raised, but not to the same extent, and similar results are obtained with hepatotoxic drugs, SGPT values being greater than SGOT values. Hemolytic jaundice in the adult usually produces little or no elevation of the transaminase values.

The use of serum transaminase estimations in cardiology has been noted recently in these columns.¹ They are now used widely to aid in the diagnosis of myocardial infarction. Wróblewski states that estimations of lactic dehydrogenase, malic dehydrogenase, phosphoisomerase and aldolase, while much less used, give essentially the same results, as is to be expected if the assumption is correct that the enzymes escape into the blood from the necrosed cells of the infarct. Estimations of serum concentrations of lactic dehydrogenase, proteinase, phosphohexoisomerase, glutathione reductase, aldolase and phosphoglucosmutase have been used to aid in the diagnosis of neoplasms. None of them is completely reliable for the diagnosis of localized or disseminated neoplasia. In patients suffering from malignant neoplasia with serous fluid which contains malignant cells, lactic dehydrogenase activity of the effusion is greater than the respective SLD value, and this fact has been found useful in characterizing cellular constituents of a serous effusion. Estimations of enzyme contents of cerebro-spinal fluid have not yet been of much use. Various forms of primary muscular and neuro-muscular disease are associated with raised serum enzyme values. In the case of dermatomyositis abnormally high values are found in patients during the acute phase of the disease, and SGOT activity falls with clinical improvement. Blood enzymes play a role in blood clotting, and increasing attention has been given to fibrinolysis, an enzyme which appears to influence blood clotting. After thoracic surgery increased fibrinolysis has been observed and may account for post-operative oozing and hemorrhage. Excessive oozing after hepatic lobectomy has been found to be related to the fibrinolytic activity of the blood.

While these and other blood enzyme estimations have already been found to be useful in aiding diagnosis, they have definite limitations. Most, if not all, are non-specific, and at best they can aid in diagnosis when other data point to the diagnosis. However, the concomitant estimation of several enzymes with clinical correlation can at times indicate the type and site of pathological processes.

¹ Ann. Intern. Med., 1959, 50: 62 (January).

² Med. J. Aust., 1959, 1: 334 (March 7).

Abstracts from Medical Literature.

RADIOLOGY.

Chest Radiography in the Diagnosis of Pulmonary Embolism.

G. M. STEIN *et alii* (*Amer. J. Roentgenol.*, February, 1959) state that as a result of widespread misconceptions regarding the clinical and radiological manifestations of pulmonary embolism, in many hospitals this diagnosis is rarely made except in fatal cases. Since patients with pulmonary embolism are frequently too ill to have multiple exposures made in various degrees of rotation, the radiological study must often be restricted to a single antero-posterior exposure made at the bedside with a portable apparatus. It is therefore important that the radiologist should be familiar with the more common variations of a pulmonary infarct as seen in this projection. The typical pattern of X-ray changes in the chest after embolism is as follows: moderate-sized homogeneous densities are observed in one or both lower lobes, extension to a pleural surface is usually demonstrable, and a small pleural effusion is commonly present. Linear densities resembling flat areas of atelectasis are seen in the same or contralateral lung. Infarct shadows may resolve rapidly, but more often clear gradually with development of one or more linear scars. In many instances the original radiographic study may be compatible with pneumonia, and only when serial skiagrams show characteristic changes will pulmonary embolism be suggested radiologically. Occasionally a pulmonary infarct may be so well circumscribed that primary or metastatic neoplasm is simulated. Densities appear rapidly after embolism. In cases studied by the authors, abnormal findings were observed as frequently in skiagrams made within 24 hours of the onset of symptoms as in those made subsequently. Densities resulting from embolism were slow to resolve. Abnormal findings cleared within a week in five cases and persisted for more than four weeks in 19 cases. Although effusion is a common finding following pulmonary embolism, the effusion is usually small and of little clinical importance. However, the authors call attention to the not infrequent instances in which pulmonary embolism is associated with a large effusion and state that such cases require differentiation from tuberculous pleurisy with effusion.

Thromboembolism of the Lungs.

J. ARENDT and M. ROSENBERG (*Amer. J. Roentgenol.*, February, 1959) state that post-operative pneumonia, atelectasis and pleurisy are often manifestations of embolism. The incidence of thromboembolism of the lung, both of surgical and of medical origin, has remained high in spite of greater clinical awareness and better methods of prevention such as vein ligation and anticoagulant treatment. The clinical signs and symptoms are frequently suggestive, but radiography and angiocardigraphy are in a high percentage of cases decisive. Thromboembolism without infarction presents as

an abnormal transparency of the involved lung segment with absence of one or both of the large hilar vessels. The heart shadow assumes a peculiar shape, best described as the "amphoric" type. In the absence of both hilar vessels a large saddle embolus must be considered. A thrombus or embolus which is located slightly more peripherally within the main branches of the pulmonary arteries causes a buckling and aneurysmal widening of the vessel with either a sharp cut-off or tapering at the peripheral end of the embolus. Such thrombus or embolus is compatible with life, and leads to the development of either acute or chronic cor pulmonale. In contrast to the cor pulmonale of obstructive emphysema, the position of the diaphragm is elevated, the heart does not assume the vertical position and develops within a short time enlargement of inflow and outflow tracts of the right ventricle. Thromboembolism with infarction does not as a rule present Westermarck's sign of increased transparency of a lung segment, since it occurs mostly in a congested lung with dilated bronchial arteries and numerous collaterals. Infarcts represent an area of ischemic necrosis usually located at the periphery of the lung. They are rarely "wedge-shaped", as the apex of the wedge is cut off. A "truncated" cone or an "umbrella" shape results, which is quite characteristic. Smaller infarcts have a cuboid or meniscus-like appearance. In the costo-phrenic angle the "hump-shaped" elevation on the medial side of a small pleural effusion has frequently been observed and appears diagnostic. The base of an embolic infarct is sometimes the interlobar fissure line, along which it forms a parabolic shadow which is best seen on a lateral skiagram.

External Ventricular Laryngocele.

E. N. BURKE and J. L. GOLDEN (*Amer. J. Roentgenol.*, July, 1958) state that the X-ray appearance of a laryngocele is so typical that there are hardly any lesions which might create confusion in the differential diagnosis. Branchial cleft cysts, enlarged lymph nodes, or cysts and tumours of the larynx are easily eliminated. Lateral pharyngeal diverticula may present a similar X-ray appearance, but are usually smaller and somewhat higher in position. A laryngocele may be associated with dysphagia, as are pharyngeal diverticula. It can be readily differentiated by a swallow of barium. With this a pharyngeal diverticulum is seen to fill, while the laryngocele, being intralaryngeal in position, does not fill. A laryngocele may cause deviation of the larynx and trachea from the mid-line. The air cavity of the laryngocele may vary greatly in size and shape. It may contain serous fluid, in which case a fluid level will be seen in the upright position, or it may also contain pus, which will produce the same appearance. The laryngocele may be seen to change in size if the patient is able to distend it at will. Laryngocele may be due to various predisposing causes, such as the presence of an abnormally long sacculus of the ventricle, which is not supported by the action of the thyro-arytenoid muscle. (This may be due to persistence of an infantile type of sacculus, which is,

in proportion to surrounding structures, very long.) It may also be due to a hernia through a congenital weakness in the thyro-hyoid membrane, or due to an increase in intralaryngeal pressure brought about by coughing, straining, playing a wind instrument, shouting, etc. Finally, it may be a secondary consequence of a pathological stricture at the level of the false cords, as a result of fibrosis, granuloma or tumour.

Fixed Defects in the Gall-Bladder Wall.

E. A. TEN EYCK (*Radiology*, December, 1958) states that fixed filling defects of the gall-bladder are sometimes found during oral cholecystographic examination. Cholesterosis is by far the commonest cause of polypoid lesions. The rarer possibilities are true papillomata, inflammatory polypi, attached calculi, and vascular defects. The following diagnostic points should be considered when attempting to identify polypoid lesions: (i) The concentration of dye within the gall-bladder is usually good. (ii) The defect is smooth and either round or oval. (iii) The size is usually less than 0.5 cm. and rarely greater than 1.0 cm. (iv) There is no calcification. (v) There is no change in the position of the defect on repeated examinations. (vi) When there are two or more defects, their relationship remains constant on repeated examinations. (vii) In the upright position there is no movement of the defect. (viii) Tangential views will show the attachment of the lesion to the gall-bladder wall.

Primary Interstitial Myocarditis.

J. MUNK and K. T. LEDERER (*J. Fac. Radiol. (Lond.)*, October, 1958) report their radiological observations in 33 cases of primary interstitial myocarditis in the age group six months to three and a half years, during an outbreak in the Haifa area. According to the size and shape of the heart, three stages of myopathic heart configuration are shown, presenting phases of the increasing myogenic dilatation of the heart. In cases that permitted further observation, gradual decrease of the size of the heart with eventual return to normal could be seen. The radiological appearances of passive pulmonary congestion are discussed. Cases are presented with the typical appearances of arterial, venous and lymphatic engorgement extending into the most peripheral parts of the lung fields (third zone) together with Kerley's B lines. In addition cases are reported in which there was a pathological interstitial pattern suggestive of diffuse interstitial pneumonia, such patients showing marked emphysema. The deduction is drawn that the combination of primary interstitial myocarditis with diffuse interstitial pneumonia must be a relatively frequent occurrence. Radiological evidence of the presence of pleural fluid was commonly seen. The most important task of the radiologist is considered to be the differentiation between acute inflammatory pulmonary disease and myocarditis. The differential diagnostic features between heart failure due to myocarditis and diffuse interstitial pneumonia are described, marked emphysema with a small heart and absence of Kerley's B lines pointing in favour

of the latter. In addition, the pathological interstitial pattern in diffuse interstitial pneumonia is usually limited to the paramediastinal regions, leaving the outer third free. The fine granular miliary pattern in acute bronchiolitis is thought to permit the differentiation of this disease. The radiological signs of the combination of primary interstitial myocarditis with diffuse interstitial pneumonia are discussed, the most important feature being a marked emphysema and at the same time an enlarged heart. Sub-endocardial fibro-elastosis offers no differentiating radiological signs. The radiological appearances of secondary myocarditis due to diphtheria, poliomyelitis, meningitis, nephritis, bacterial endocarditis, etc., present no radiological differential diagnostic features. — An important differential diagnostic sign between primary interstitial myocarditis and pericardial effusion is believed to be the rare or very late occurrence of left heart failure in the latter.

Fibrocystic Disease of the Pancreas.

H. WHITE (*Radiology*, December, 1958) states that fibrocystic disease of the pancreas is an hereditary, generalized, glandular disease of children manifested by pancreatic deficiency, chronic pulmonary lesions, disturbances of the sweat and salivary excretion, and cirrhosis of the liver. Though the name suggests a primary disease of the pancreas, this is misleading, since almost all of the exocrine glands are involved. The author states that the condition is almost entirely limited to the Caucasian race, and that in America it occurs about once in 600 live births. Radiological manifestations are limited primarily to the chest and abdomen. As an aid to diagnosis, the radiologist should be aware: (a) that the disease is usually first manifested between the ages of six months and two years; (b) that three out of four cases of so-called non-tuberculous bronchopneumonia in infancy are attributed to fibrocystic disease; (c) that it is the leading cause of atelectasis in infants under one year; (d) that it is a common cause of unexplained bronchiectasis and chronic asthma. Fibrocystic disease should therefore be suspected in the presence of any persistent non-tuberculous pulmonary lesion in infants and children.

RADIOTHERAPY.

The Treatment of Cancer of the Breast.

D. W. SMITHERS (*Amer. J. Roentgenol.*, November, 1958) presents a study of failures in the treatment of early carcinoma of the breast and success with advanced disease. Failure in early cases is usually due to distant blood-borne metastases. Mastectomy is the first method of choice in early cases, being necessary for diagnosis and grading of the tumour, as well as the most certain treatment for well localized disease; the decision as to the extent of mastectomy should be taken on the merits of each case. Points favouring a bad prognosis should limit, not extend, the use of surgery, which, if it does not

succeed completely, may well make matters worse. The author considers that large medial tumours with a short history are the only ones in which irradiation before mastectomy is often indicated in Stage I, especially when the patient is obese and difficult to examine. All patients with tumours of the inner half of the breast, and all with tumours of the outer half with histological involvement of axillary lymph nodes should have post-operative irradiation to axillary, supraclavicular and parasternal lymph nodes. In all young women before the menopause who have Stage III tumours, tumours of multicentric origin, extensive perivascular or perineural lymphatic permeation or involvement of axillary fat, an artificial menopause should be considered as part of the first planned treatment. In some late cases success may be achieved in the pre-menopausal group if a menopause is induced and energetic irradiation employed, especially if the spread is by lymphatics rather than by blood vessels. In elderly patients, oestrogen treatment combined with irradiation may also result in some long-term survivals. Adrenalectomy, hypophysectomy and radioactive pituitary implants have all produced dramatic regressions, even in patients with widespread blood-borne metastases. However, all these treatments have their own difficulties and complications; time is still required for the assessment of their value, which must be weighed against their disadvantages. The author concludes that careful selection of patients most likely to benefit by each method or combination of methods so as to reduce the amount of unnecessary suffering which may be inflicted, is of the greatest importance. The endocrinological methods hold out such prospects of control of disseminated disease that they are of immense potential importance for the future. It is necessary to assess their present value for each patient in the light of what may be achieved by less drastic measures.

Malignant Tumours of Childhood.

E. PATERSON (*J. Fac. Radiol. (Lond.)*, October, 1958) discusses the incidence of cancer in children and points out that it is becoming an increasingly important cause of death in children; in England and Wales it is now the most common cause of death in the group aged one to 14 years. There is a great variety of types of tumours in children, but they mostly fall into five main groups. These are tumours of the lymphoreticular system, brain, abdomen (excluding gut), connective tissue and eye. Three types of abdominal tumour are discussed: (i) mesonephroma of the ovary, which is fairly rare, fairly radio-sensitive, but not curable; (ii) neuroblastoma, which usually arises from the adrenal medulla and is occasionally curable by radiotherapy, providing the tumour has not spread beyond the trunk; it is always possible to give good palliative relief with X-ray therapy, and the use of vitamin B₁₂ is mentioned; (iii) Wilms' tumour, which is best managed by a combination of surgery and radiotherapy, and the author considers that it does not necessarily matter which comes first so long as it is a planned treatment. In the central nervous system, the curable tumours are

two; these are the differentiated astrocytoma, which is best dealt with surgically but is also curable by radiotherapy if small, and the medulloblastoma, which is entirely a radiotherapeutic problem; for the latter tumour, the whole neural axis is irradiated, and a three-year survival rate of 55% has been obtained, falling to 41% at five years. The management of retinoblastoma is also discussed, including the place of radiotherapy in the treatment of residual tumour after surgery and as the definitive treatment of one eye in bilateral cases. The biggest group of tumours comprises those of the lymphoreticulum, the commonest of which is acute leukaemia. In children a good response can be obtained by chemotherapy, and the use of the antibiotics and the delta-corticoids in the management of this condition is discussed. Also in this group are Hodgkin's disease, lymphosarcoma and reticulosarcoma, the management of which is similar to that in adults. In conclusion, the author makes some general comments on radiotherapy in children.

Results of Treatment of Carcinoma of the Oesophagus.

H. S. PETTIT (*Amer. J. Roentgenol.*, May, 1957) discusses the results of treatment of carcinoma of the oesophagus on the basis of a study of 219 cases in patients admitted to hospital between 1943 and 1955. Of the entire group, 18 patients were between the ages of 28 and 40 years when the diagnosis was made. Over 90% gave dysphagia as a presenting symptom. The oesophagus contains no pain fibres, so it is not until other structures are involved that pain is experienced, and this was the second most common symptom. Of 92 patients who had symptoms for less than three months, in only 47 was the growth resectable. Diagnosis is established by X-ray examination with barium, and by oesophagoscopy with biopsy. Occasionally the fluoroscopist sees no abnormality or the result of biopsy is negative; examinations should be repeated in the case of a patient with persistent dysphagia. Block dissection is almost impossible for mid-thoracic oesophageal lesions because of the intimate relation of the growth to the spine, aorta and trachea; in cervical oesophageal lesions there is a strong likelihood of extensive metastasis to cervical lymph nodes. Recent reports have indicated that successful resection may be carried out for lesions of the lower third of the oesophagus. Treatment by X-ray therapy requires meticulous technique to include possible extension of disease. Results are poor with either method, but radiation may offer excellent palliation, even in advanced cases. Radiation therapy was started on 65 patients, including 30 who received only palliative doses or less; there were five survivors after one year. A review of skiagrams and autopsy material to determine extent of the disease showed that 26 patients had been possibly curable by radiation therapy, and that 217 had had tumours confined to the oesophagus which were theoretically resectable. The grade of tumour, the duration of symptoms and the apparent length of the lesion have been found to be of little value in estimating how effective either radiation or resection will be.

On The Periphery.

BRUSSELS, 1958.

Five years ago the Belgian Government, with the approval of the King, decided to hold an International Exposition or World Fair in Brussels during the year 1958. This was to be a modern exhibition of the art and produce of the nations of the world in the setting of the atomic age. Steps were taken to attract as many individuals as possible to Brussels, but also all international or European bodies who planned meetings in 1958 were to be encouraged to hold them in this city. For this reason the International Council of Cardiology decided, at its meeting in Washington D.C. in 1954, to accept the invitation of the Belgian Society of Cardiology to hold the third World Congress of Cardiology in Brussels in 1958. A number of other international medical organizations did the same thing.

Brussels is a famous and prosperous city, with art treasures, architecture, and historical monuments of such importance that it merits special attention from visitors to Europe in any year or season. The concurrence of an International Fair and a World Medical Congress naturally did much to compete with these more permanent treasures of the city. Much had been done to improve traffic flow, hotels and pensions facilities had been vastly increased, and an army of attractive young ladies had been enlisted and trained as guides to assist the millions of visitors who came to Brussels in 1958. This complex machinery was moving fairly smoothly by September, but nothing could be done to lessen the crowds in the streets, trams and cafes, which, although they detracted from each other's comfort, all helped to repay the great expenditure of money and labour on the part of the Belgian Government and the city fathers of Brussels. Events of this magnitude added to the expenses of each visitor; but additional facilities for touring, sightseeing, shopping and entertainment compensated considerably and made a visit to Brussels in 1958 an unforgettable and important landmark in the life of all who were fortunate enough to be there.

The plan of inner Brussels is not difficult to master. The great boulevards mark the site of the old fortifications and together form a pentagonal ring around the old city on the banks of the river Senne. One gateway still stands to remind the traveller of the turbulent history of the city, once Spanish, Austrian, French, Dutch and now finally the capital of Flanders. Implicated early and irrevocably in the mesh of the two World Wars, it has, nevertheless, suffered functionally much less than one would have expected, and its industrious burghers have managed their business affairs so well since, that it is again one of the richest and most progressive cities of Europe. To this, no doubt, the untapped wealth of the Congo has contributed and will continue to contribute—unlike Belgium's neighbour Holland, which suffered heavily from the loss of the rich resources of Indonesia.

The city had, of course, had an extensive "face lift" in preparation for this important year. Tunnels were constructed to speed up the traffic along the *grands boulevards*. The wonderful old guildhalls and ducal palaces and the *Hôtel de Ville*, lining the *Grande Place*, had been redecorated with gold leaf and was illuminated by night. The new and imposing *Gare du Midi* had been completed in record time.

Always energetic and progressive, the Belgians were the first since the war to conceive the ambitious plan of organizing a great world exhibition, according to a modern design, where the artists, architects, engineers and builders of the atomic age would be encouraged to display their dreams in colour and design in wood and steel or cement and plastic. An attempt was to be made to review the progress, the achievements and the future of this amazing century in art, science and industry. A more deeply significant purpose was by this means to bring together, for their mutual instruction, enlightenment and entertainment, peoples of varying ideologies and cultures. No world exhibition had been seen for twenty years, and it was a magnificent opportunity for Belgium, in the centre of populous Europe, to achieve more glory and riches for herself, as well as to forge new bonds between her neighbours. In this tremendous task, on an area one-third that of Brussels itself, was erected a fantastic dreamland of exciting pavilions, instructive exhibitions, beautiful gardens and unique transportation facilities.

The Government of Belgium placed the giant task of organization and supervision in the capable hands of the Baron de Moens Fernig, and, as his office and reception hall, the beautiful Royal Villa of Belvedere with its superb gardens was renovated and decorated in great taste and

luxury, as a fitting setting for the numerous receptions which he, as the representative of the Belgian Government, together with his charming wife, gave to officials of visiting organizations during the six months of the Exposition. Forty-eight countries and many international institutions participated in this great undertaking. Australia, for some incomprehensible reason, did not have a pavilion, but all the principal peoples of Europe from Andorra to Great Britain, a number from South America, the Middle East and almost all those behind the *rideau de fer* applied for and were granted an area in the foreign section, on which they had to construct buildings which were to be of an approved magnitude, type and standard. Other notable absentees from the scene were China, South Africa, the West Indies, India, Pakistan and East Germany; but there were magnificent exhibits from all four corners of the earth. Some of the most exotic displays were those of the Belgian Congo, Thailand, Japan and Cambodia, but all were characteristic, interesting and tasteful. In each, one saw examples of goods produced in home or factory, some of which were usually for sale at nearby counters, as well as illustrations of engineering projects, historical models, heavy industries, and also actual evidence of the art and culture of the people concerned. Naturally most interest was shown by the millions of visitors in the palaces prepared by the great nations of the world—e.g., Great Britain, the United States of America and the U.S.S.R. Each of these was very different; each was representative of national character; each was impressive. The British elected to house their exhibits of machinery, softgoods and a hundred other products in several structures of unique cuboidal design and in a street of typical London shops, even having their marine exhibits floating in a lake. They won the prize for the best designed exhibit. The American pavilion resembled an enormous "boater hat" upside down, fronted by a lake of fountains, in the centre of which fashion models continually paraded. Inside were examples of many unique products, such as voting machines, mechanical limbs, atomic machinery, automobiles, a convincing replica of a corner drug store, and an American theatre. The Russian entry was an enormous rectangular structure, approached by an impressive staircase at the head of which a gigantic Lenin extended welcoming arms. Inside were again examples of engineering products, many pictures of laughing Russians hard at work in field or factory, models of the three "Sputniks", a ballet stage, clever models of the Russian Antarctic Base and many counters for the sale of books, stamps, leather wear and cigarettes. The obvious opportunity to propagandize the Russian way of life in many tongues was fully exploited, and to judge from the constant press of visitors in the vast building, it certainly attracted much attention. In many palaces, artisans of the nations concerned could be seen at work in many different materials, and on every day some form of entertainment such as music, dancing, or ballet, by internationally famous players, was provided in the great auditoria or in the open air. Belgium naturally granted herself a larger allotment of space than other countries and in addition to the national and colonial exhibits, arranged a reproduction over twelve acres of a part of Brussels in 1900, with contemporary vehicles, cabarets, theatres and quaint shops conducted by citizens in the dress of that day. Most congress visitors, however, made sure that they visited the International Hall of Science with its wealth of educational exhibits, films and models of industrial plants and ultra-modern electric aids. Exhibitions directed to "the atom", "the molecule", "the crystal" and "the living cell" illustrated progress in modern physics, chemistry, solid state physics and biology. Space exploration will no doubt occupy a large section of this display at the next World Exposition. Just as the Eiffel Tower symbolized the 1889 Paris World Exhibition, the 360 feet high Atomium dominated the centre of that of Brussels. It represented the atomic structure of a crystal of iron, enormously magnified. The constituent atoms were represented by steel spheres, each 59 feet in diameter. The interior of each was reached by escalators, the lower ones housed an exhibition of the peaceful uses of atomic energy, and the highest a restaurant, from which a magnificent view of the whole park was to be obtained.

In the International Palace of Arts, consecutive exhibitions were dedicated to "modern art" and its progress in the twentieth century, and to "man before art". Originals of all the early French School were to be found in the Hall of Honour, and some 300 pictures and sculptures had been assembled in this unprecedented collection. This beautiful gallery, together with the other great palaces, will remain for ever as a permanent reminder of the Exposition, and will become the rendezvous for future national and international reunions.

Sydney.

J. K. MADDON.

Correspondence.

GROWING UP IN A CHANGING WORLD.

Sir: Dr. G. P. O'Day, in the Journal of April 11, 1959, says that "delinquency has waned" under socialism but has not supported this with any evidence.

Two references to delinquency behind the Iron Curtain have appeared in articles on the subject in *The Sydney Morning Herald* by writers in London.

T. R. Fyvel, on April 11, writes:

The Phenomenon.

What lies behind this?

It is interesting enough, for the record, that when we look behind the Iron Curtain we find that in the cities of the Soviet Union the problem of youthful violence has found its most acute expression of all. The censored Soviet Press only reveals shortcomings when they have reached the proportions of a political problem. Thus, when Soviet newspapers complained about the hooliganism and drunkenness in Moscow, Leningrad, Tiflis, Rostov, Odessa, Dniepropetrovsk, Sverdlovsk and dozens of other places, one can take it that in the Communist Utopia juvenile crime has become a bigger problem than anywhere in the capitalist world.

And in the Soviet Union—if we take one more look across the Iron Curtain—it is instructive to find newspaper abuse directed not so much against the mass of ill-educated young Soviet ruffians as against the notorious "stilyagi" or "style-boys", a kind of Soviet gilded youth whose long haircuts, small-cuffed trousers, draped jackets and crepe soles show that in spite of all censorship they have modelled themselves on Western Teddy Boys, evidently in the pathetic belief that the Teddy Boy presents a height of fashion.

Malcolm Muggeridge, on April 12, says:

A grisly little book recently published ("The Eighth Day of the Week") by a Polish writer, Marek Hlasko, describes the Warsaw equivalent.

In Moscow and Leningrad are to be seen the familiar sideburns, padded shoulders, drooping coats and slouching figures.

Soviet newspapers and magazines, like ours, frequently write about the unsatisfactory behaviour and state of mind of some of their youth.

Yours, etc.,

ALAN GRANT.

225 Dunbar Street,
Stockton.

April 11, 1959.

SEVERE TETANUS TREATED WITH TUBOCURARINE CHLORIDE ("TUBARINE") AND TANK RESPIRATION.

Sir: It was with great interest that I read Dr. Gordon Sarfaty's article on treatment of a severe case of tetanus in a tank respirator (*Med. J. Aust.*, April 11, 1959).

In June, 1958, I shared with Dr. Drummond, also of Wauchope, a case of tetanus which was too ill to remove from this small town. This boy, aged 18, had an incubation period of six days, the time of onset from first rigidity to first spasm being under one hour, and developing intermittent spasms every few minutes in spite of the usual precautions.

We performed tracheostomy under a cyclopropane, nitrous oxide, oxygen anaesthesia. Positive pressure resuscitation with a Boyle's machine was continued whilst awaiting a tank respirator from a nearby town. "Largactil" (intravenously) and "Tubarine" were used to control the spasms in the tank respirator, and we used an angled iron, bolted into the head of the tank, to keep the airway clear between the rubber diaphragm and the tracheostomy tube. In view of the large amounts of "Largactil" we were using during the first 24 hours, we decided to freeze the patient in addition. By use of packed ice and suitable ventilation we reduced the rectal temperature to 31°C. The wound was excised, and intravenous anti-tetanic serum given in the usual way. Intramuscular "Achromycin" was given six-hourly, and we changed the "Largactil" to "Sparine" on the second day to avoid liver jaundice. About the third day we were using a total of about 60 mg. of "Tubarine" per 24 hours, and about 100 mg. of "Sparine". Every 12 hours the patient was washed and turned under

positive pressure respiration. No bed sores developed, the bitten tongue healed, also the excised wound. We fed the patient on "ActaVite" in milk, about 40 ounces by gastric drip per day.

Cough respiration was attained by slamming the doors of the tank at the appropriate phase of respiration. He collapsed the left lung on the sixth day, but with active slamming of the doors and tracheal suction he reexpanded this lung. The pulse rate in the respirator during the first eight days averaged 70 per minute. We did not record his blood pressure. By the ninth day the urinary output diminished suddenly, and he vomited whilst we turned him and he subsequently vomited about two hours later whilst in the tank and inhaled some vomitus. We managed to suck the chest clear, and on examination could not hear any bowel sounds. We then instituted continuous gastric suction and introduced a cuffed endotracheal tube to prevent further inhalation of vomitus.

Over the next twelve hours he continued to vomit, and we diagnosed a paralytic ileus as the vomitus was obviously faecal. Prior to this complication he was opening his eyes on aural stimulation and looking round for short periods, and we felt that he was much improved, especially as the "Tubarine" and "Sparine" necessary was almost negligible. There had been no spasm for 24 hours except for odd twitches of the abdominal muscles.

He died 14 hours after the onset of vomiting, from inhalation of vomitus due to paralytic ileus. It is interesting to know now that had this complication not developed we might have saved him. At the onset of vomiting we sent a blood sample to Sydney for serum electrolytes. The potassium was high and the chloride and sodium low. As we did not know the normal values during a prolonged freeze anaesthesia, we did not know the significance of this, or why the paralytic ileus developed.

In the light of our experience we felt that the following mistakes had been made: (i) A guarded, cuffed tracheostomy tube should be used with packing of the larynx above it. (ii) Intravenous feeding should be used. (iii) No sedatives used at all. (iv) Serum electrolyte readings taken with known normals during prolonged freeze anaesthesia. (v) The desirability of the freeze is now open to doubt, in view of this last report. We used it to lessen the amount of sedatives and "Tubarine" necessary and reduce the danger of peripheral circulatory failure due to the high fever usually associated with this disease, and certain death by previous methods. (We could not by reference to available literature find any indication that a tetanus case of this severity had previously survived.)

Yours, etc.,

E. M. THOMAS.

150 High Street,
Wauchope.
April 12, 1959.

HEALTH CARE IN AUSTRALIA.

Sir: Your article on "Health Care in Australia" (*Med. J. Aust.*, March 21, 1959) makes one freshly realize, among other things, how great the achievements of our profession are in the medico-political field. This, having been done in face of mounting national and world-wide pressure towards restriction of freedom of the patient-doctor relationship, is to the greatest credit of our representative bodies and their permanent officers, the medical secretaries.

The extension of the fee-for-service principle in respect of war widows seems to me of an importance which reaches far beyond the small material gain arising from its implementation, because it finally wipes out the last nasty blot of capitation from our medical services. To strengthen further this vitally important principle from within our ranks, it seems to me that we should urge the respective Branches to introduce an ethical rule, that all forms of "retainers" are forbidden and should be replaced by a fee for service rendered to each individual patient. This should apply particularly to private practitioners who have agreements with industrial firms or other institutions. It could, of course, not apply to salaried medical officers who have limited rights of private practice.

I wonder if you could, Sir, place this suggestion in your correspondence column for discussion.

Yours, etc.

E. E. BERNARD.

728 Sydney Road,
Brunswick, N.10,
Victoria.
April 4, 1959.

Obituary.

DARCY RIVERS WARREN COWAN.

ANY obituary of the late Sir Darcy Cowan would be incomplete without some reference to his father, whose capacity and sterling character were notable in his son. James Cowan was born in Ulster in 1848, and four years later came with his parents to South Australia. On leaving school he entered his father's coaching and farming business but soon started business on his own account as a mail contractor and small farmer. His enterprise led him to purchase a flour mill, and within a few years James Cowan was the proprietor of mills in four country towns as well as of wharves at two seaports. He suffered heavy financial loss when a severe depression affected the Province, and the failure of the Commercial Bank of South Australia seriously affected him. His difficulties were but temporary. He had good fortune to buy Broken Hill Proprietary shares at a low price, and their wonderful rise to £1200 made him again a wealthy man. He assisted in the formation of a Coke Company at Port Pirie, the genesis of the huge smelting works of today. In 1890 Mr. James Cowan was elected Member of Parliament for Yatala, and at once made a great impression on the House in debates, and was regarded as a possible Minister of the Crown. He had been a Member of Parliament for only a few months when he met his death by accident on July 21, 1890.

Sir Darcy Cowan was the youngest of his five sons, all of whom attended Prince Alfred College. The little company drove to their school in a dogcart. Like his father, Darcy was not daunted by opposition or failure, but pressed on to his objective and his ultimate success. During his student years he excelled at sport. He was one of the very few "triple blues" of the University of Adelaide. His love of tennis persisted throughout his life. He became a member of the Grounds Committee of the South Australian Lawn Tennis Association in 1920, and was chairman for many years. He was then vice-president for 20 years, and an honorary organizer for the 1952 Davis Cup Challenge Round. As a player he will be remembered as a skilful exponent of the game, who always enjoyed a match and played it in true sporting spirit. It was his policy and direction as chairman of the Grounds Committee which brought the Memorial Drive courts to a state described by overseas authorities as "as good as any courts in the world not excluding Wimbledon".

He served his own teaching hospital, the Royal Adelaide, for many years as honorary physician and later as honorary consulting physician, and was also the first person to be appointed senior physician to the chest clinic. During this time he was the lecturer in pulmonary tuberculosis at the University of Adelaide.

He was president of the South Australian branch of the British Medical Association in 1935 and 1936.

Amid all his other achievements, Darcy Cowan will be remembered best for his life-long crusade against tuberculosis, which began after he attended the famous clinic of Dr. Philip at Edinburgh. The genesis of the National Association for the Prevention of Tuberculosis in Australia dates back to the formation of the South Australian Tuberculosis Association in 1943. Dr. (later Sir) Darcy Cowan planned the State body on the model of others he had studied in overseas centres. To assure the strongest possible prestige for the association, Dr. Cowan prevailed upon Sir Henry Simpson Newland to accept office as president of the new organization. Sir Henry Newland at that time had been holding office as president of the Federal Council of the British Medical Association for many years, and his remarkable ability brought great benefits to the many bodies he served or supported. A little later a similar association was formed in Western Australia, and approaches were made to the B.M.A. to give official support to a national organization. At the seventh session of the Australasian Medical Congress (B.M.A.) held at Perth in 1950, a resolution was carried approving the proposals submitted. A provisional committee was formed to draft a constitution. Medical men from each capital city returned to their homes determined to assist in this sponsorship. Sir Henry Newland was appointed president and Dr. Darcy Cowan as honorary secretary, *pro tempore*.

At the first meeting of the National Council in Adelaide, the constitution was formally adopted and Sir Henry Newland was named as foundation president. Dr. Cowan continued in the guiding role of honorary secretary. Affiliation was immediately granted by NAPT London

and the International Union against Tuberculosis, and a Council of Honour was formed on which His Excellency the Governor-General and the Governors of each of the six States accepted seats. The new body found great assistance from the ready cooperation given by older-established national associations in other lands. Films, printed matter and radio platters were made available by NTA New York, which enabled NAPT to extend propaganda work within the Commonwealth. From his own membership and knowledge of the work of the American Trudeau Society, Dr. Cowan sought next to establish a similar medical section in Australia. Thus was the Australian Laennec Society organized. Today the society has a branch in most States of the Commonwealth, and undertakes studies at scientific levels. Dr. Cowan served as president of the Laennec Society in 1955. In 1957 his fellow workers determined to show him honour by offering a prize for graduates, to be known as "The Sir Darcy Cowan Prize". This will be awarded for the first time this year.

In a personal appreciation SIR HENRY SIMPSON NEWLAND has written:

My more intimate association with Darcy Cowan began when he invited me to be president of the South Australian Tuberculosis Association. This post I accepted on two conditions: one, that a more militant attitude should be adopted in the prevention of tuberculosis, and the other that an Australian National Association for the Prevention of Tuberculosis should be formed to coordinate the activities of the States of the Commonwealth and to be the medium of approach to the Commonwealth Government. Sir Darcy agreed to these conditions and most loyally sought to fulfil them. It was a notable triumph for him when the National Association for the Prevention of Tuberculosis in Australia met in Sydney, and was attended by delegates not only from Australia and New Zealand but from several Asian countries.

In 1948 the Commonwealth Government passed the Tuberculosis Act, which permitted a great acceleration of the campaign. Under this Act the Commonwealth found funds to subsidize the State health authorities and to provide for capital outlay on new hospitals, etc. The tuberculosis allowance payable to patients somewhat relieved the economic plight of sufferers, and with the passage of years this has become even more generous. It must be claimed that the improved lot of the tuberculous patient is in great measure due to the untiring work and pleadings of men such as Sir Darcy Cowan, who stirred public opinion, secured support from the profession and made strenuous representations to the legislatures.

In 1950 a splendid new factory was opened to provide rehabilitation opportunities for men and women. This was named Bedford Industries. The actual structure has been named "Cowan Building" in recognition of Sir Darcy Cowan's part as founder and guiding spirit in this great practical work. Today the industry represents a total capital investment of almost £60,000, and while it cannot be conducted at a profit, the Association, with the generous assistance of the State Government, is able to bear the costs and provide helpful employment for some 80 persons a year.

In all this progress the Association was led and inspired by Sir Darcy Cowan, who in 1955 was granted the honour of knighthood in recognition of his wonderful services to the community.

Until the time when failing health forced him to retire from all offices, Sir Darcy Cowan fought the good fight with vigour. His remarkable knowledge and enthusiasm made him a most acceptable leader of the various councils in both National and State spheres. He expected action and constant progress, and fearlessly criticized any appearance of *laissez-faire* or complacency in either official or voluntary quarters. With his old friend and associate, Sir Harry Wunderly, he planned for the time when tuberculosis might be eradicated in Australia. He constantly "prodded" Ministers of the Crown, members of the profession, his colleagues and his subordinates to improve the lot of sufferers and to assist in the final victory over this disease.

Sir Darcy Cowan was for years the official Australian correspondent for NAPT London, and he was a member of the American College of Chest Physicians and of the Trudeau Society. He was known and respected by leaders in the campaign in many lands. At the first International Conference on Tuberculosis in Sydney in 1955, Sir Darcy Cowan played a great part in the organization, and he himself went to live in the residential college so that he could develop his knowledge of fellow workers from all Asian countries.

Sir Darcy Cowan was a great Australian, and truly a great world citizen.

DR. CHARLES SWAN writes: On a gray cheerless day in June, 1941, I carried a wet X-ray film to the Chest Clinic at the Royal Adelaide Hospital, where Dr. Darcy Cowan was coming to the end of one of his long sessions. As he confirmed the diagnosis he must have sensed my inner panic, and I well remember the matter-of-fact way in which he discussed my case, the warm yet quizzical smile, and the confidence he radiated, so that I was able to go home to bed, full of hope and at peace.

Next morning he appeared, lugging a wooden case in which reposed the apparatus for inducing artificial pneumothorax. Because of adhesions it was necessary to maintain the pneumothorax at a pressure of +20 mm. of mercury, which entailed two or three visits per week. Rain or shine (and it was mainly rain that winter), and despite the manifold calls of a busy practice, made worse by the war years, Darcy Cowan continued to appear. Later, when I became sufficiently ambulant, refills were continued at his rooms. To add a macabre touch to the proceedings he would sometimes talk of the dangers of air embolism;

billiard table because a patient had suffered an hæmoptysis while playing. "On this basis", he scoffed, "considering that many patients have hæmoptyses while at rest in bed, we should dispense with beds."

To the end of his life he maintained his faith in courses of tuberculin injections, which he believed made for better healing, and on which he was an acknowledged authority.

Almost certainly because of his clashes at higher levels, official recognition of his great services to medicine and to the nation came too late for him really to enjoy it. This delay must remain a matter for reproach. The widespread acclamation with which his knighthood was greeted afforded considerable satisfaction and pleasure to those responsible for bringing his name before the appropriate authorities.

Darcy Cowan has gone to his long rest. The debt of gratitude of his countless patients can never be accurately assessed. How much more immeasurable is the debt of future generations! For it is by the work and example of men of his calibre that tuberculosis, with its attendant suffering, misery and tragedy, will ultimately be banished from the earth.

DR. H. M. JAY writes: The death of Sir Darcy Cowan has brought to an end a life of unstinted and devoted service to the community. Only those who knew him well and were aware of his many activities can estimate justly the loss that this State has suffered. As one who graduated with him and was privileged to be his close friend since our school days, and who has played with him and worked with him, I find it hard to express my feelings towards this truly splendid man without being accused of fulsomeness. His was a dedicated life, given to the tuberculous patient and to the fight for the eradication of tuberculosis.

Darcy travelled widely, and brought to his problems a breadth of vision which often proved an embarrassment in negotiations with officialdom—others could not see so far ahead as he could. This inevitably produced an antagonism, which was not always allayed by the fighting spirit that activated the man. No obstacle was too great for him to tackle, no opposition too strong for him to face. Such was his enthusiasm that opposition frequently aroused in him indignation and even anger. But resentment was fundamentally against ideas, and not individuals, as he was ever ready to extend the olive branch to his opponents once the atmosphere had cleared.

In the formulation of his plans, so often above the imagination of others, it is quite remarkable to the onlooker how frequently subsequent events proved him to have been correct in his policies.

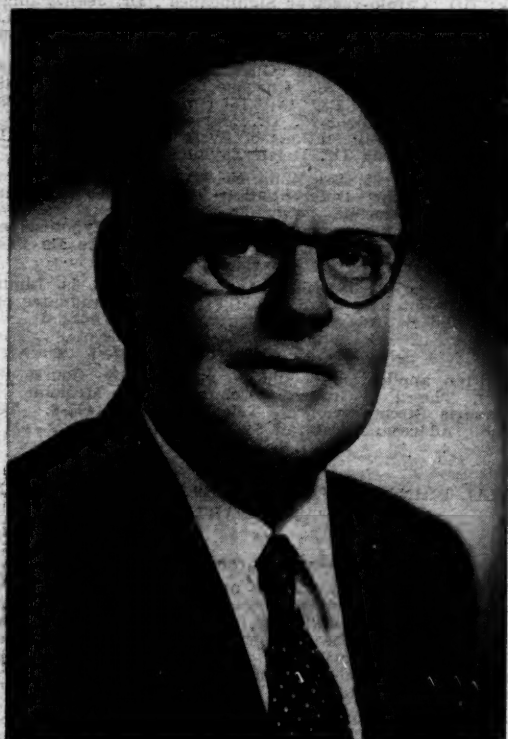
It required many years of hard work, enthusiasm transmitted to others, the overcoming of financial difficulties and numerous setbacks, before Bedford Industries (a rehabilitation centre modelled on Papworth in Cambridge-shire) was established. This building bears his name, and will be a lasting monument to his memory. Northcote Home, a unique institution for the housing of children of tuberculous parents, was another of his achievements; this is now well established and receives Government support. I think it is doubtful whether any of his countless successes gave him more satisfaction than the establishment of these two institutions.

Darcy's humanity, and his habit of making his patients' troubles his own, endeared him to scores of those who came under his care. He had only to feel that one of these was being unfairly treated in his occupation, and immediately he was up in arms in defence of his patient; and his successful battle to obtain a reasonable living allowance for the tuberculous was only another instance of this side of his remarkable character.

In the last few months of his life, he received the news that the Parent Body of the B.M.A. had conferred upon him the great honour of life membership, whilst the Laennec Society has instituted the Darcy Cowan Prize for essays on affections of the respiratory tract.

Hundreds of South Australians mourn for a great benefactor, I for a dear and trusted friend.

CENTRAL BOARD OF HEALTH: At its meeting on June 10, 1958, the Central Board of Health, South Australia, resolved to place on record its high appreciation of the work of the late Sir Darcy Cowan in the fight against tuberculosis in this State. The Chairman, Dr. A. R. Southwood, said that Sir Darcy Cowan had worked untiringly in promoting measures for the care and general welfare of sufferers from tuberculosis; over the years his advice in the public health aspects of tuberculosis control had been extremely valuable. When Sir Darcy Cowan



but by that time I had such confidence in his skill that I never entertained the slightest fear that such a dire calamity would be my portion. In order to maintain a difference in levels, one of the air bottles was balanced on a pile of books, the topmost one of which was always a gold-lettered, red-bound copy of Osler's "Aequanimitas with Other Addresses", which had been presented by a grateful patient, and which I suspect he had never read. He had little need to, for throughout his professional career, this quality of equanimity remained paramount in his treatment of patients.

It was not always in evidence, however, in his dealings with higher authority. His whole life was motivated by a passionate desire to treat tuberculosis adequately and eventually to eradicate it, to ensure economic security for the patient and his family, and to rehabilitate him once the disease had been arrested. In consequence, official red tape, apathy and delay, evoked trenchant criticism in which he favoured the broadsword rather than the rapier.

At all times he adopted a commonsense attitude. I recollect his telling me of a case in which the committee of management of a sanatorium wished to remove the

had begun his work in Adelaide, nearly fifty years earlier, the usual (and often only) advice to sufferers was that they should "go north": the dry air was supposed to have health-promoting value. When medical science evolved various effective methods of treatment, Sir Darcy Cowan was quick to adopt them for the help of his patients. He had played an active part in the development of the Australia-wide attack against tuberculosis since 1945; in his later years he enjoyed the satisfaction of observing the dramatic results of that work.

Out of the Past.

In this column will be published from time to time extracts, taken from medical journals, newspapers, official and historical records, diaries and so on, dealing with events connected with the early medical history of Australia.

VACCINATION IN MELBOURNE¹

[From the *Australasian Medical Gazette*, February, 1883.]

A GOOD DEAL of animadversion has taken place upon what I think is rightly regarded as the irregular proceedings of those medical men who, in taking up the question of calf lymph vaccination, have allied themselves with non-professional persons. For many years past vaccination with lymph taken directly from the calf has been going on at the Government model farm, and on the first of last month it was semi-officially announced that 2000 persons had been vaccinated in this way. There is, of course, no objection to the public fancy being thus gratified, for calf lymph is, presumably, at least as efficacious as humanised lymph, though of its superior value there is, I think, abundant reason for question. But there is a good deal of objection to permitting the operation to be done by a legally unqualified person, and some information is required as to the circumstances under which a veterinary surgeon has been quasi officially recognized in the capacity of public vaccinator. The announcement, it is true, refers to Mr. Graham Mitchell as "Superintending the cultivation of the lymph", but the impression is, that he actually vaccinates as well as "Superintends" and as this is contrary to the vaccination statute, some inquiry is, so I am informed, about being made into the matter. It is certainly not creditable to Dr. Le Fevre that he should have countenanced this irregularity.

Post-Graduate Work.

THE POST-GRADUATE COMMITTEE IN MEDICINE IN THE UNIVERSITY OF SYDNEY.

COURSES FOR GENERAL PRACTITIONERS DURING JUNE, 1959.

The Post-Graduate Committee in Medicine in the University of Sydney announces that the following courses for general practitioners will be held during June, 1959.

Week-end Course in Rheumatic Diseases.

A week-end course in rheumatic diseases will be held from 10.15 a.m. to 5 p.m. on Saturday, June 6, and from 9 a.m. to 1 p.m. on Sunday, June 7, in the Scot Skirving Lecture Theatre, Royal Prince Alfred Hospital. The fee for attendance at this course is £3 3s.

Course in Psychological Aspects of General Practice.

This course is primarily designed to meet the needs of general practitioners interested in the psychological aspects of medical practice, and those who have a special interest in the doctor-patient relationship in this field. There will be 25 sessions of one and a half hours' duration, led by Dr. D. C. Maddison, and held in the Post-Graduate Department of Psychiatry at Broughton Hall, Church Street, Leichhardt, at 8 p.m. each Wednesday, beginning on June 10 and terminating in December, 1959. The course will take the form of case material from the participants.

¹ From the original in the Mitchell Library, Sydney.

own practices, with the ultimate aim of increasing the candidates' skill in interpersonal relationship and broadening their experience in the psychological aspects of general practice. Enrolments will be limited, and written application should be made not later than May 15. The fee for attendance at this course is 25 guineas.

Week-end Course in Renal Diseases.

A week-end course in renal diseases will be held from 10.15 a.m. to 5 p.m. on Saturday, June 20, and from 9.15 a.m. to 1 p.m. on Sunday, June 21, in the Scot Skirving Lecture Theatre, Royal Prince Alfred Hospital. The fee for attendance at this course is £3 3s.

Week-end Course in Medicine at the Rachel Forster Hospital for Women and Children, Redfern.

The following week-end course in medicine will be held at the Rachel Forster Hospital for Women and Children, Redfern, and will be open to all members of the medical profession:

Saturday, June 27, Dr. Willa Nelson in the chair: 9 to 10.30 a.m., "Pain in the Arm": (i) "Orthopaedic and Neurological Aspects", Dr. Claire Weekes and Dr. Nanette De Cock; (ii) "Cardio-vascular Significance", Dr. Jean Palmer; (iii) "Radiological Aspects", Dr. Marjorie Dalgarno, 10 a.m. to 12 noon, "Management of Renal Failure", Dr. Reginald Walker; 12 noon to 12.30 p.m., "Psychological Aspects of Enuresis", Dr. Marjorie Gilchrist; 1.45 to 2.30 p.m., "Common Symptoms of Unsuspected Endocrinal Origin", Dr. Helen Taylor; 2.30 to 3.15 p.m., "Uses and Abuses of Diagnostic Radiology", Dr. Marjorie Dalgarno; 3.30 to 5 p.m., "Skin Manifestations of Systemic Disease": (i) Dr. F. Goldschlag, (ii) Dr. Helen Taylor.

Sunday, June 28, Dr. Willa Nelson in the chair: 9.30 to 10.45 a.m., "The Differentiation of Episodes of Acute Myocardial Ischaemia", Dr. Jean Palmer; 11 a.m. to 12.30 p.m., symposium on treatment: (i) "Hypotensives", Dr. Willa Nelson; (ii) "Diuretics", Dr. Nanette De Cock; (iii) "Steroids", Dr. Claire Weekes.

The fee for attendance at this course is £3 3s. Limited accommodation is available for women graduates for Friday and Saturday nights at £2 2s.

Method of Enrolment.

Written application should be made to the Course Secretary, The Post-Graduate Committee in Medicine, 131 Macquarie Street, Sydney. Telephones: BU 4497-8. Telegraphic Address: "Postgrad Sydney".

ROYAL PRINCE ALFRED HOSPITAL: EAR, NOSE AND THROAT DEPARTMENT.

Seminar Programme, 1959.

The staff of the Ear, Nose and Throat Department will conduct a seminar on the second Saturday of every month at 8 a.m. in the Scot Skirving Lecture Theatre, Royal Prince Alfred Hospital. The main speaker will not exceed forty minutes, and there will be a discussion at the conclusion of his remarks. All medical practitioners and clinical students are invited to attend.

At the next seminar, to be held on May 9, 1959, Dr. E. H. Ross will speak on "The Management of Deafness".

The Australian College of General Practitioners.

NEW SOUTH WALES FACULTY.

THE New South Wales Faculty of The Australian College of General Practitioners will hold the first of its two regular annual post-graduate week-ends at the Hotel Florida at Terrigal, from May 29 to 31, 1959. The guest lecturers and their subjects will be: Dr. T. M. Greenaway, "Modern Diagnostic Techniques"; Mr. W. D. Cunningham, "Pitfalls in Obstetrics"; Dr. R. T. Hoy, "Radiation Hazards". The week-end will commence on Friday, May 29, at 5.30 p.m., with cocktails, which will be followed by several films, by courtesy of Messrs. Burroughs Wellcome and Co. (Australia) Ltd., who are providing the projector and operator. Lectures will be held on Saturday afternoon, May 30, and Sunday morning, May 31. A short meeting of

the Faculty will be held at 11 a.m. on the morning of Saturday, May 30. There will be a dinner and dance on the Saturday night, and the week-end will conclude after luncheon on the Sunday. The organizing secretary for the week-end is Dr. W. McP. Roberts, 11 Redmyre Road, Strathfield.

The World Medical Association.

Appointment of Deputy Secretary-General.

DR. LOUIS H. BAUER, Secretary-General of The World Medical Association, announces that the Council of the Association, meeting in Sydney, has appointed Dr. John M. Bishop, of Bellevue, Washington, as Deputy Secretary-General of The World Medical Association. Dr. Bishop is a graduate of the University of North Dakota with a degree of bachelor of science, and received his M.D. degree from the University of Illinois. He served several years in the United States Public Health Service, resigning in 1957 with the grade of Senior Surgeon (Lieutenant-Colonel). During his Public Health Service career, Dr. Bishop had extensive service in Europe as consultant and supervisor of medical activities. This service involved not only public health, but clinical medicine and administration. He was in a liaison capacity with governmental and voluntary agencies, and with local governmental and professional society officials in Europe, North Africa and the Middle East. After his resignation from the U.S.P.H.S., Dr. Bishop entered private practice in Bellevue, Washington. As a member of the United States Committee of The World Medical Association, he has attended several general assemblies of W.M.A. and assisted the Secretariat at each of them. Dr. Bishop is a member of his local and State medical societies and of the American Medical Association. He is married and has four children. Dr. Bishop is expected to take up his new duties as deputy to Dr. Bauer on about May 1, 1959.

President-Elect.

Dr. Renaud Lemieux, of Quebec, Canada, was elected at the 35th Council Session of The World Medical Association at Sydney, Australia, on March 25 to April 5, 1959, to fill

the casual vacancy as President-Elect of the Association for the term 1958-1959. Dr. Lemieux, Professor of Medicine at Laval University, a recent Past President of the Canadian Medical Association, was nominated to fill the vacancy resulting from the untimely death of the incumbent, Dr. Léon Gérin Lajole, of Montreal, Canada. Dr. Lemieux is no stranger to international medical groups. Among numerous other activities, he has been a member of the Canadian delegation to the World Health Assembly. On confirmation of his election by the delegates of the XIIIth General Assembly of The World Medical Association, to be convened in Montreal, Canada, on September 7 to 12, 1959, Dr. Renaud Lemieux will be instated as the twelfth President of The World Medical Association.

Notes and News.

Rehabilitation.

A new addition to the *Excerpta Medica* series is one dealing with rehabilitation. This is Section XIX of the series; volume 1, number 1, was published in July, 1959. It is intended that this special section of *Excerpta Medica* will be devoted to the experimental, clinical and programme aspects of rehabilitation. It consists, as do all the sections in this series, of abstracts of articles in its own field taken from journals throughout the world.

Medical Practice.

NATIONAL HEALTH ACT.

THE following notice is published in the *Commonwealth of Australia Gazette*, No. 19, of March 19, 1959.

NATIONAL HEALTH ACT, 1953-1958.

Notice Under Section 134A.

Notice is hereby given that the Medical Services Committee of Inquiry for the State of Victoria, after

DISEASES NOTIFIED IN EACH STATE AND TERRITORY OF AUSTRALIA FOR THE WEEK ENDED MARCH 28, 1959.¹

Disease.	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Northern Territory.	Australian Capital Territory.	Australia.
Acute Rheumatism .. ..	..	2(2)	1	..	..	..	..	..	3
Amoebiasis .. ..	..	..	..	..	..	..	..	..	..
Ancylostomiasis .. ..	..	..	..	..	..	..	6	..	6
Anthrax .. ..	..	..	..	..	..	..	..	..	..
Bilharziasis .. ..	..	..	..	..	..	..	..	..	1
Brucellosis .. ..	..	1	..	..	..	..	..	..	..
Cholera .. ..	..	..	..	..	..	..	..	..	..
Chorea (St. Vitus)	1	..	..	..	..	..	..	..	1
Dengue .. ..	..	..	..	..	..	..	..	..	..
Diarrhoea (Infantile)	1	9(3)	5(4)	..	..	..	2	..	17
Diphtheria .. ..	..	..	..	..	..	..	..	..	..
Dysentery (Bacillary) .. ..	..	3	..	1(1)	..	..	1	..	5
Encephalitis .. ..	..	1(1)	..	1	..	..	..	..	2
Filariasis .. ..	..	..	..	..	..	..	..	..	..
Homologous Serum Jaundice .. ..	..	..	..	..	..	..	..	..	..
Hydatid .. ..	..	..	..	..	..	..	..	..	..
Infective Hepatitis	52(14)	24(12)	16(10)	5(4)	..	..	..	..	97
Lead Poisoning .. ..	..	..	..	1	..	..	..	..	1
Leprosy .. ..	..	..	..	..	..	..	..	..	..
Leptospirosis .. ..	..	..	5	..	..	..	..	..	5
Malaria .. ..	..	1(1)	1	..	..	..	..	..	2
Meningococcal Infection	1(1)	2(2)	..	..	2	..	..	..	2
Ophthalmia .. ..	..	..	..	..	..	..	..	..	..
Ornithosis .. ..	..	..	..	..	..	..	..	..	..
Paratyphoid	1(1)	..	..	..	..	..	..	..	1
Plague .. ..	..	..	..	..	..	..	..	..	..
Polioomyelitis	1	..	..	..	..	..	..	..	1
Puerperal Fever	1	..	..	2	..	..	..	..	1
Rubella .. ..	..	20(15)	..	1	8(5)	..	..	..	30
Salmonella Infection .. ..	..	..	..	..	..	..	..	..	1
Scarlet Fever	10(2)	20(12)	1(1)	..	1	..	..	..	32
Smallpox .. ..	..	..	1	..	..	..	..	..	1
Tetanus .. ..	..	..	..	..	20	..	13	..	33
Trachoma .. ..	..	..	..	..	..	..	..	..	..
Trichinosis .. ..	..	..	..	..	..	..	..	..	..
Tuberculosis	24(15)	9(6)	11(6)	..	9(3)	1(1)	4	1	59
Typhoid Fever .. ..	..	1	..	..	..	..	..	..	1
Typhus (Flea-, Mite- and Tick-borne) .. ..	..	..	..	..	..	..	..	..	..
Typhus (Louse-borne) .. ..	..	..	..	..	..	..	..	..	..
Yellow Fever .. ..	..	..	..	..	..	..	..	..	..

¹ Figures in parentheses are those for the metropolitan area.

investigation, having reported on the eighteenth day of December, 1958, concerning the conduct of Eric Fox of 16 Anderson-street, Yarraville, medical practitioner, in relation to his authority under section eighty-eight of the National Health Act 1953-1958, I, Donald Alastair Cameron, the Minister of State for Health, did on the fifth day of February, 1959, reprimand the said Eric Fox.

Dated this fifth day of February, 1959.

DONALD A. CAMERON,
Minister of State for Health.

Notice.

BRITISH MEDICAL ASSOCIATION.

Victorian Branch: Preventive Medicine Section.

A MEETING of the Preventive Medicine Section of the Victorian Branch of the British Medical Association will be held in the Medical Society Hall, 426 Albert Street, East Melbourne, on Thursday, May 14, 1959, at 4.30 p.m. Dr. Alan Ferris, of the Epidemiological Research Unit, Fairfield Hospital, will speak on "Enteric Viruses in a Semi-Closed Community". All interested are invited to attend.

THE CHILDREN'S MEDICAL RESEARCH FOUNDATION OF N.S.W.

THE following is a list of donations to the Children's Medical Research Foundation of N.S.W. received from members of the medical profession in the period February 25 to March 17, 1959.

Dr. and Mrs. E. F. Dowe, £10 10s.

Dr. J. Vernon (further donation), £5.

Dr. R. F. Rossleigh (second donation), £3 3s.

Previously acknowledged: £7911 4s. 9d. Total received to date: £7929 17s. 9d.

Nominations and Elections.

THE undermentioned have applied for election as members of the New South Wales Branch of the British Medical Association:

Greening, Dorothy Grace, M.B., B.S., 1956 (Univ. Sydney), The Women's Hospital, Crown Street, Sydney.

Dax, Albert Andrew, M.D., 1934 (Univ. Budapest) (regional registration in accordance with the provisions of Section 21A of the Medical Practitioners Act, 1938-1958, in respect of the Goodooga Region), Goodooga, New South Wales.

Ople, Peter Bruce, M.B., B.S., 1956 (Univ. Adelaide), c.o. Dr. R. J. Jennaway, Mary Street, Auburn.

Thomson, William Kenneth Allen, M.B., B.S., 1953 (Univ. Sydney), 14 Pembroke Street, Sylvania.

Medical Appointments.

The undermentioned have been appointed members of the Advisory Committee of the Queen Elizabeth Hospital, Adelaide: Dr. K. S. Hetzel (nominated by the Council of the University of Adelaide), Professor R. P. Jepson (nominated by the Faculty of Medicine of the University of Adelaide), Sir Brian H. Swift (nominated by the Board of Management of the Queen Elizabeth Hospital), Dr. R. M. Glynn (nominated by the Board of Management of the Queen Elizabeth Hospital), Dr. I. A. Hamilton (nominated by the honorary medical staff of the Queen Elizabeth Hospital), Dr. M. W. Miller (nominated by the honorary medical staff of the Queen Elizabeth Hospital), Dr. A. H. Lendon (nominated by the Royal Australasian College of Surgeons), Dr. R. A. Burston (nominated by The Royal Australasian College of Physicians).

The following appointments have been made at the Institute of Medical and Veterinary Science, Adelaide, pursuant to the *Institute of Medical and Veterinary Science Act, 1937-1944*: Dr. K. Cheney has been appointed Assistant Clinical Pathologist. Dr. J. D. Booth has been appointed Registrar in Clinical Pathology. Dr. C. K. Chew has been appointed Registrar in Clinical Pathology.

Diary for the Month.

- MAY 5.—New South Wales Branch, B.M.A.: Organization and Science Committee.
- MAY 6.—Western Australian Branch, B.M.A.: Branch Council.
- MAY 6.—Victorian Branch, B.M.A.: Clinical Meeting at the Commonwealth Serum Laboratories.
- MAY 7.—South Australian Branch, B.M.A.: Council Meeting.
- MAY 8.—Queensland Branch, B.M.A.: Council Meeting.
- MAY 8.—Tasmanian Branch, B.M.A.: Branch Council.
- MAY 12.—New South Wales Branch, B.M.A.: Executive and Finance Committee.
- MAY 14.—New South Wales Branch, B.M.A.: Public Relations Committee.

Medical Appointments: Important Notice.

MEDICAL PRACTITIONERS are requested not to apply for any appointment mentioned below without having first communicated with the Honorary Secretary of the Branch concerned, or with the Medical Secretary of the British Medical Association, Tavistock Square, London, W.C.1.

New South Wales Branch (Medical Secretary, 135 Macquarie Street, Sydney): All contract practice appointments in New South Wales. Anti-Tuberculosis Association of New South Wales.

South Australian Branch (Honorary Secretary, 80 Brougham Place, North Adelaide): All contract practice appointments in South Australia.

Editorial Notices.

ALL articles submitted for publication in this Journal should be typed with double or treble spacing. Carbon copies should not be sent. Authors are requested to avoid the use of abbreviations, other than those normally used by the Journal, and not to underline either words or phrases.

References to articles and books should be carefully checked. In a reference the following information should be given: surname of author, initials of author, year, full title of article, name of journal, volume, number of first page of the article. The abbreviations used for the titles of journals are those of the list known as "World Medical Periodicals" (published by the World Medical Association). If a reference is made to an abstract of a paper, the name of the original journal, together with that of the journal in which the abstract has appeared, should be given with full date in each instance.

Authors submitting illustrations are asked, if possible, to provide the originals (not photographic copies) of line drawings, graphs and diagrams, and prints from the original negatives of photomicrographs. Authors who are not accustomed to preparing drawings or photographic prints for reproduction are invited to seek the advice of the Editor.

Original articles forwarded for publication are understood to be offered to THE MEDICAL JOURNAL OF AUSTRALIA alone, unless the contrary is stated.

All communications should be addressed to the Editor, THE MEDICAL JOURNAL OF AUSTRALIA, The Printing House, Seamer Street, Glebe, New South Wales. (Telephones: MW 2651-2-3.)

Members and subscribers are requested to notify the Manager, THE MEDICAL JOURNAL OF AUSTRALIA, Seamer Street, Glebe, New South Wales, without delay, of any irregularity in the delivery of this Journal. The management cannot accept any responsibility or recognize any claim arising out of non-receipt of journals unless such notification is received within one month.

SUBSCRIPTION RATES.—Medical students and others not receiving THE MEDICAL JOURNAL OF AUSTRALIA in virtue of membership of the Branches of the British Medical Association in Australia can become subscribers to the Journal by applying to the Manager or through the usual agents and booksellers. Subscriptions can commence at the beginning of any quarter and are renewable on December 31. The rate is £5 per annum within Australia and the British Commonwealth of Nations, and £5 10s. per annum within America and foreign countries, payable in advance.